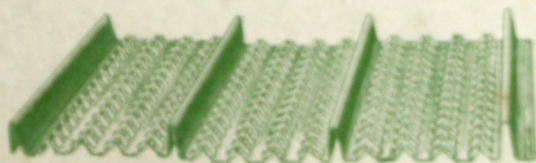


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THE
HY-RIB
HANDBOOK



THE
HAY-RIB
HANDBOOK

HY-RIB

COMBINED CENTERING & REINFORCEMENT.

Its Nature and Application for

ROOFS, FLOORS, WALLS,
PARTITIONS, CEILINGS,
FURRING :: :: ::

INDUSTRIAL BUILDINGS,
AERODROMES, HANGARS

BUNGALOWS & HOUSING,
SCHOOLS, HOSPITALS ::

SILOS, TANKS, CULVERTS,
VATS, RESERVOIRS, etc.

SEVENTH EDITION

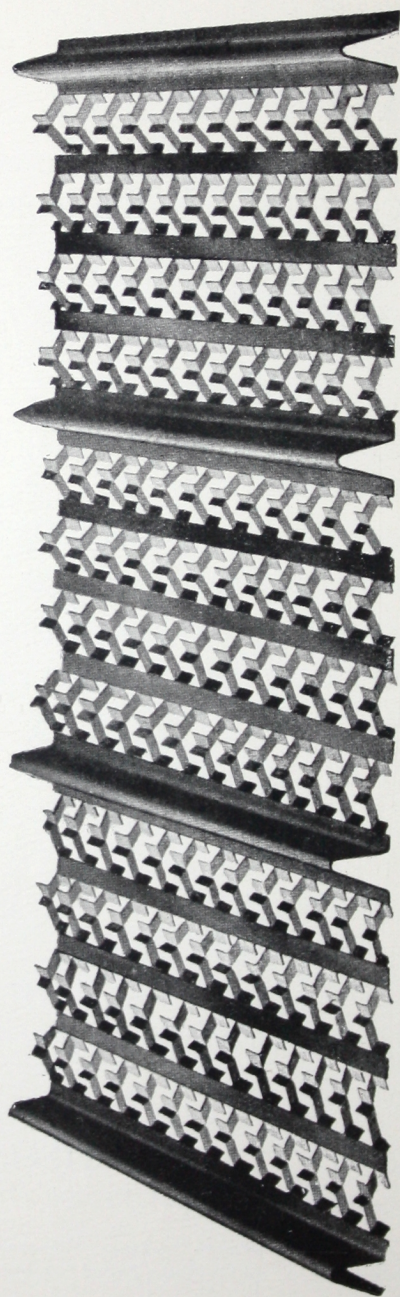
— 1920 —

THE TRUSSED CONCRETE STEEL Co., Ltd.
22, CRANLEY GARDENS, SOUTH KENSINGTON, S.W.7.

Telephone : Kensington 1049. ————— Telegrams : "Kahncrete, Fulroad, London."
:: Offices in Principal Cities :: Hy-Rib Works, Trafford Park, Manchester. ::

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For Table of Contents see page 84.



HY-RIB.

A steel lathing of great rigidity which acts both as centering and reinforcement.

HY-RIB

AN INTRODUCTION TO ITS USES.

What is it?

HY-RIB is a steel sheathing stiffened by rigid high ribs. The ribs and the lath are manufactured from a single sheet of steel, making it a complete unit of lath and studs.

Hy-Rib saves Centering and Studding.

No centering is required for spans of given area where HY-RIB is used in concrete floors and roofs, as the ribs give sufficient strength and rigidity. In walls and partitions HY-RIB does away with the use of small stiffening channels and rods. The lath surface is straight and true, and is expanded in such a manner as to provide a perfect key with a minimum amount of plaster.

Its Field of Application.

Uses for HY-RIB are found in every field of building operation—in construction work of all kinds, Walls, Floors, Roofs, Partitions, Ceilings and Furring. Curved HY-RIB is used for Arched Floors, Culverts, Conduits, Silos, Tanks, Reservoirs, and Tunnels.

Its Economy.

HY-RIB greatly reduces the cost of building work, because it does away with expensive labour and centering, and saves times in erection.

Its Permanence.

HY-RIB makes possible permanent, enduring, fire-resisting construction as opposed to perishable materials such as wood, galvanised iron, etc.

The Method of Manufacture.

It is made by pressing deep strengthening ribs into a flat sheet of best English steel, and so perforating and expanding the spaces between, that a perfect surface is provided for the application of concrete or plaster in any form.

INDUSTRIAL.

Factories, Foundries, Car Sheds, Locomotive Sheds, Aircraft Sheds and Hangars, Power Houses, Boiler Houses, Colliery Buildings, Gas Report and Chemical Plant Houses, Tanks, etc.

In all buildings of this class HY-RIB construction is being used extensively for Walls, Floors, Roofs, and Partitions, and its permanence, solidity, and waterproofness, together with its finely finished appearance, command general approval. So much trouble is occasioned by the continual repair of buildings covered with corrugated iron and similar materials, and on the other hand by the cost of thick brick walls, that HY-RIB construction is welcomed by most engineers because of its durability, economical qualities, and large resultant saving of space.

BUSINESS BUILDINGS.

In Office, Warehouse, and Public Buildings of all classes HY-RIB finds its principal uses in partition, ceiling, floor and roof construction. Thin solid partitions of 2 ins. in thickness and of great rigidity and fire-resistance may be obtained by using HY-RIB. The use of HY-RIB for floors both as light reinforcement and centering saves both time and money, while for ceilings its use permits of a perfectly even surface being obtained.

HOUSING, SANATORIA & FARM BUILDINGS.

It has been found that HY-RIB is both cheaper and better than ordinary brick construction. The double wall type, with an air channel between the walls, gives the best possible results, in that it is waterproof and warm, and prevents condensation. The inner casing of the double wall is frequently concrete breeze blocks.

The heavy cost of timber centering or falsework, the skilled labour and the special contrivances necessary in the ordinary type of concrete construction make such work expensive in small buildings. HY-RIB means a minimum of skilled labour, and being itself a centering, timber shuttering or falsework is eliminated.

Hy-Rib construction is very speedy.

HY-RIB WALLS.

General Methods of Application.

HY-RIB can be used in conjunction with framework of either steel, reinforced concrete, timber or brickwork, and is attached thereto by means of wire, special clips or staples.

The ribs of the HY-RIB take the place of studs, which are otherwise necessary, and do away entirely with the expense and labour of attaching sheets of lath to studs. Simply set up the HY-RIB—plaster both sides—and the wall is complete. No studs are necessary.

Generally it is preferable to fix the HY-RIB with the ribs inwards, because, as a rule, the external face of the wall is subject to greater variations in temperature. By thus having the lath face outwards a perfectly uniform thickness of cover is easily obtained.

If the finished wall is to be absolutely true, the face of the lath should be true before any plaster is applied to it. A fairly true surface can then be obtained simply from the trowel, with as little ruling off as possible done with a *short* straightedge. Long straightedges should be used only for testing the work.

Plastering of HY-RIB walls should be carried out in panels not exceeding 12 feet width, giving a clean joint vertically from gutter to ground. Joints should on completion of the wall be caulked in.

In using HY-RIB for forming walls, as many single sheets as is convenient should be laid on an even floor or staging, the ribs well pressed home and punched together to form a single unit as large as can be handled conveniently.

If the work is being done with the ribs vertical, twelve sheets may be fastened together into one unit. Where the ribs are horizontal, four sheets locked together may be found the most convenient unit.

The spacing of supports varies according to the conditions, but generally the following table will apply :—

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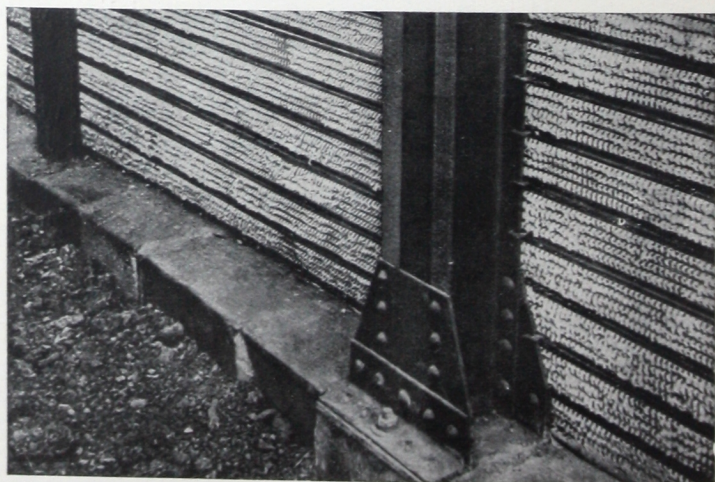
Side Walls Reinforced with Hy-Rib.

(MINIMUM REQUIREMENTS).

(RIBS OF HY-RIB RUNNING HORIZONTALLY).

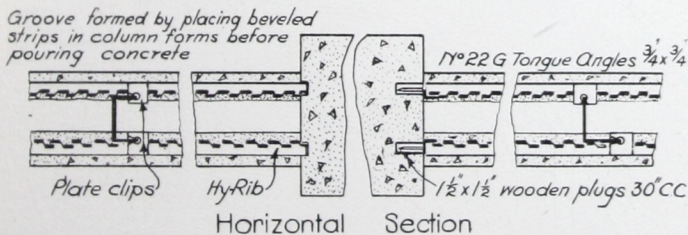
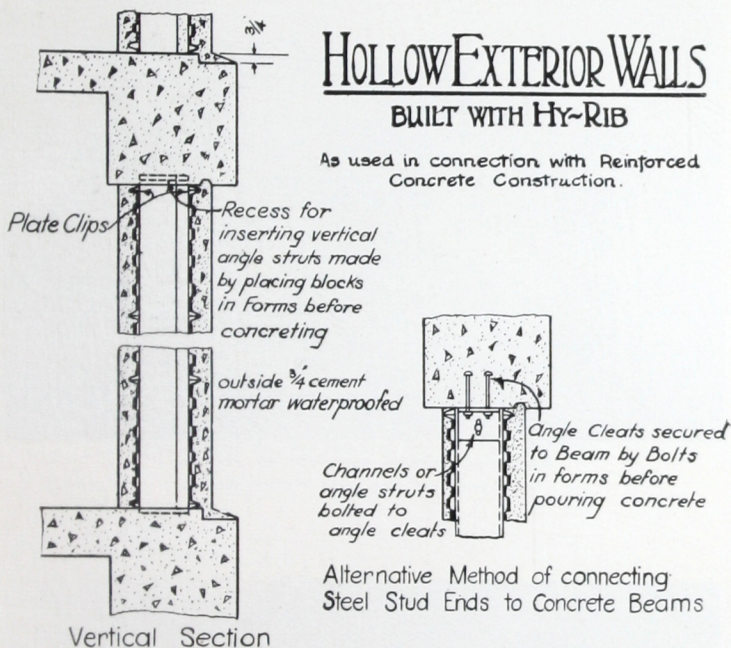
Spacing of Supports.	Thickness of Wall.	Reinforcement.
6-ft.	1 $\frac{3}{4}$ -in.	No. 28 Gauge HY-RIB
8-ft.	2-in.	No. 28 Gauge HY-RIB
10-ft.	2-in.	No. 26 Gauge HY-RIB
12-ft.	2 $\frac{1}{2}$ -in.	No. 24 Gauge HY-RIB

NOTE.—Temporary struts should be used vertically where structural supports are 6-ft. 0-in. or over.



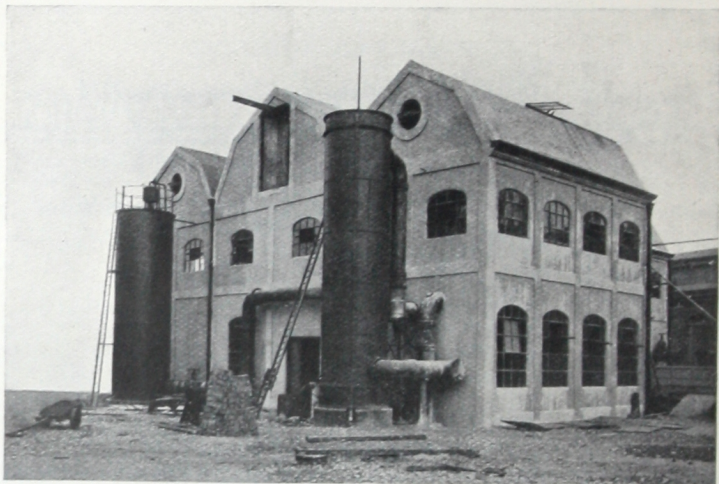
Interior view of Hy-Rib wall, after receiving one coat of plaster on outside.
Note plate clips for attaching the Hy-Rib to structural steel frame-work.

HY-RIB WALLS—TYPICAL DETAILS.



These drawings show Hy-Rib used for both outer and inner walls.

The inner Wall, however, is frequently constructed of breeze slabs.



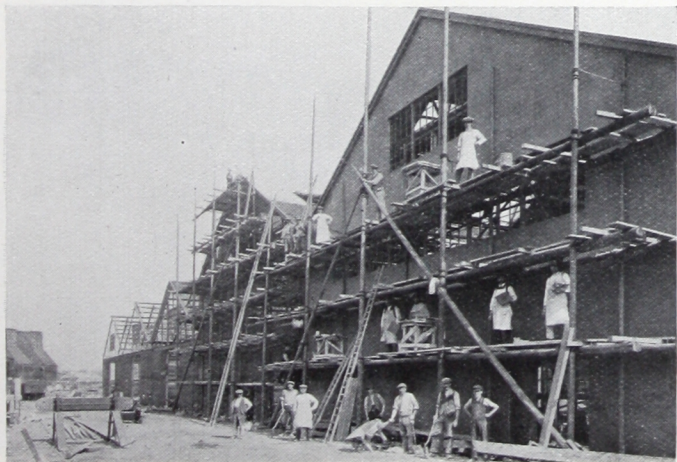
Burkhelser House complete in Hy-Rib.
Bournemouth Gas and Water Works.



Hy-Rib Walls. Tramway Sheds, City of Hull.



Hy-Rib Sheds for the Midland Railway Co., Belfast.

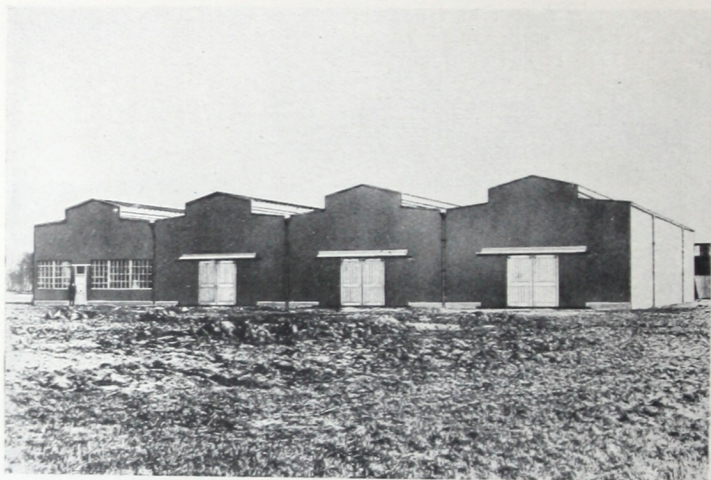


Hy-Rib Sheds for the L. & S.W. Railway at Wimbledon.

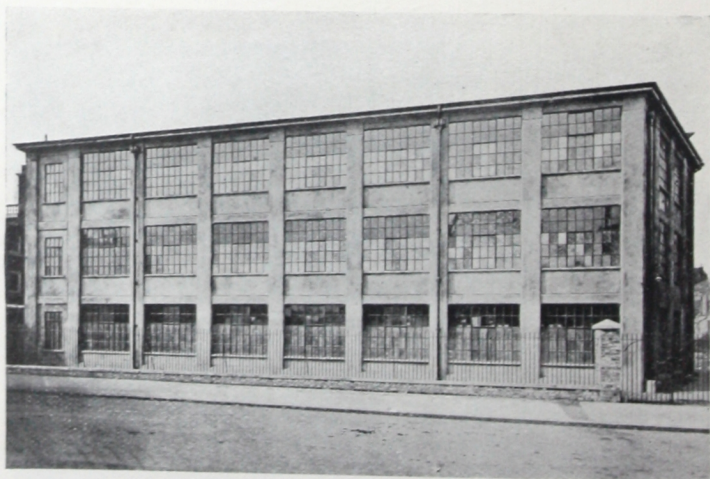
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HY-RIB—Combined Centering and Reinforcement.

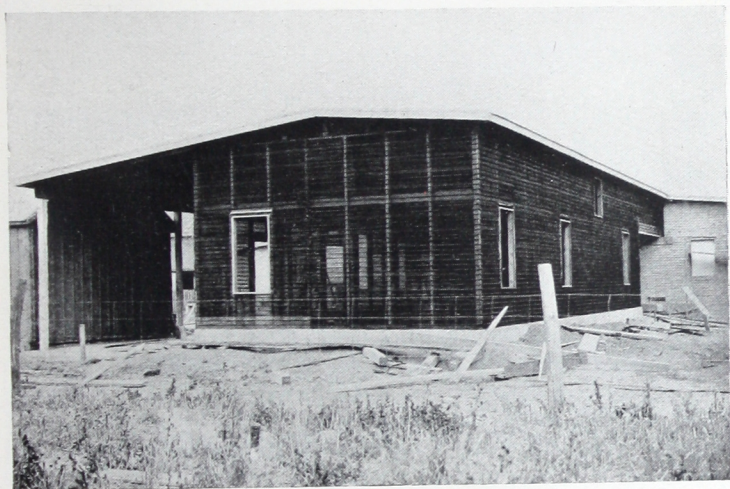
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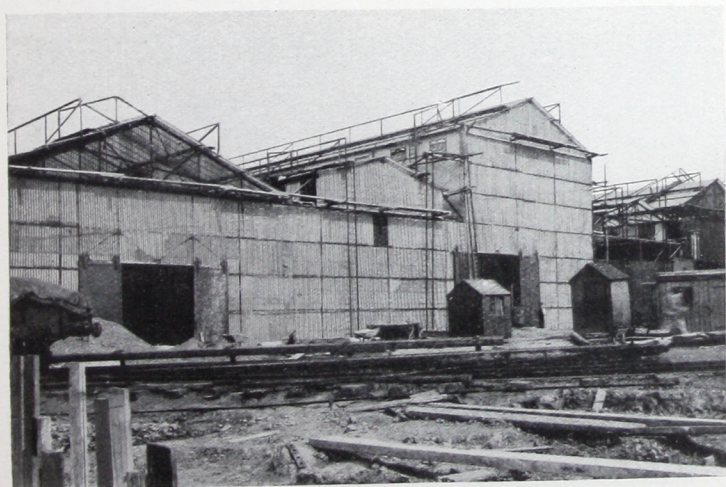
Hy-Rib Engineering Shops at Trafford Park.



Hy-Rib Daylight Factory at Clapham.



Hy-Rib Shed on Wood Studs, before plastering.
For Barns and Farm Buildings of all kinds
this construction is very suitable.



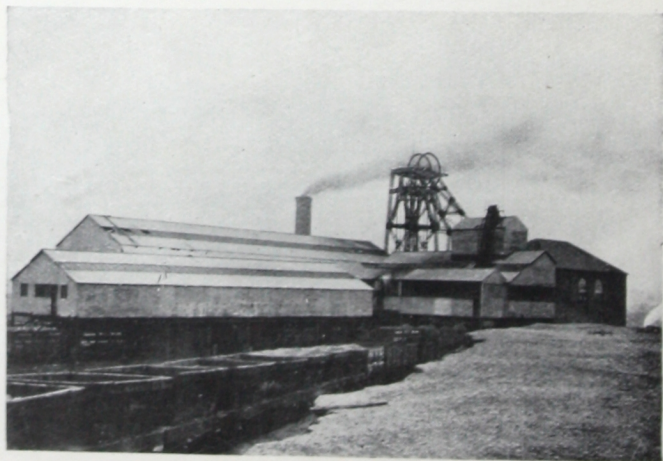
Workshops framed in Structural Steel at Hebburn-on-Tyne.
Shows Hy-Rib partly plastered on inside.

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Typical Hy-Rib Workshop Construction.
Structural Steel Framework with Hy-Rib walls and roof.



Pit-Head Buildings, The Sharlston Colliery Co.
Hy Rib structures put little weight on the ground.



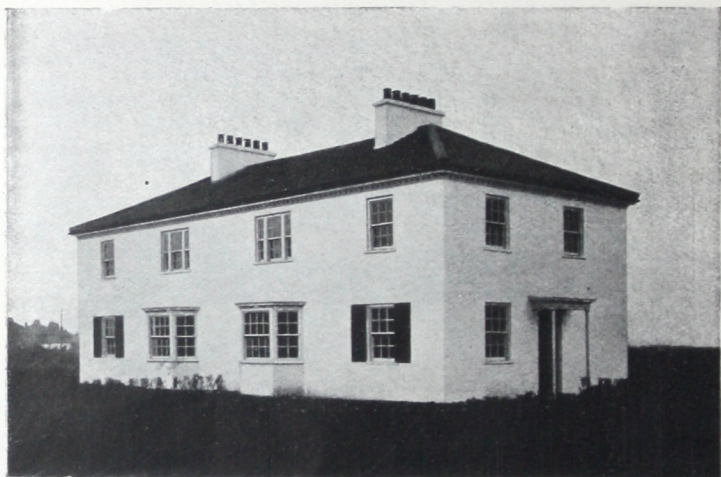
Hy-Rib Bungalow at Howth, near Dublin.
Architects, Messrs. Chillingworth & Levie.



Hy-Rib Houses at Dumfries for Messrs. Arrol-Johnston's Employees.
Hy-Rib is being used very extensively for housing.

HY-RIB FOR HOUSING.

THE DORMANSTOWN HOUSING SCHEME, REDCAR.
Consulting Architects, Messrs. Adshed, Ramsay & Patrick Abercrombie.



These fine Hy-Rib Houses are being erected complete in six weeks to the pair.

THIS HOUSING SCHEME MARKS WHAT IS PRACTICALLY A REVOLUTION IN HOUSE BUILDING.

Dorman Long & Co., Ltd. have evolved a light steel framework and HY-RIB is the basis for the Outer Walls (with inner walls of breeze slabs), for Floors, Ceilings, Roofs, etc. Constructional timber is eliminated.

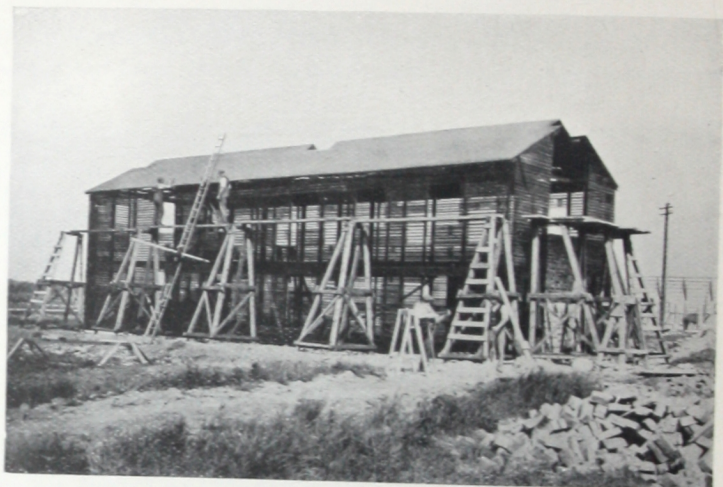
These houses, as Housing, reach a very high standard, yet are cheaper than brick. Weather-proof, fire-proof, vermin-proof—they are practically indestructible.

HY-RIB means great rapidity of construction with minimum of skilled labour.



Hy-Rib Housing at Dormanstown, Redcar.

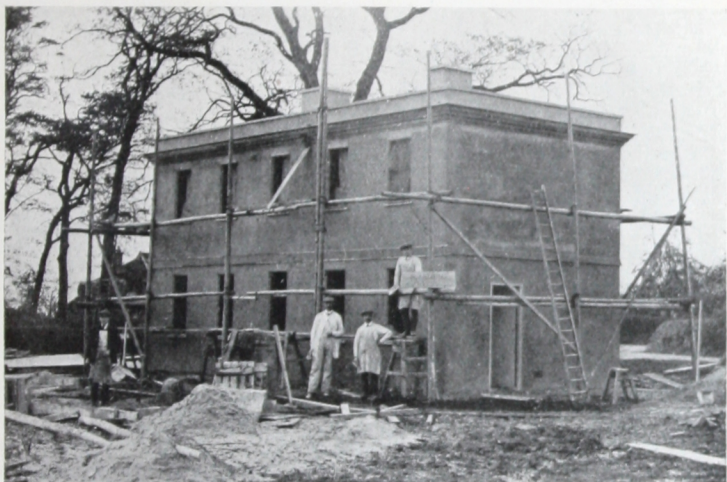
The steel frame-work erected by three men in four days without mechanical assistance.



Hy-Rib Housing at Dormanstown, Redcar.
Shows Hy-Rib attached to the frame. The roof may be finished first and work continued under its protection.



Hy-Rib Housing at Dormanstown, Redcar.
Another type of finished House.



Hy-Rib Cottage for C. Turnor, Esq., Panton.



Hy-Rib Bungalow—East Africa.



Cromer Golf Club—Hy-Rib Walls.



Cromer Golf Club—Another View.

SANATORIA.



Clayton Sanatorium, Yorkshire.—Architect, J. Harper Bates, M.S.A.

THIS Sanatorium was erected before the war at a cost of £1,200 complete, and contains 24 beds. The Local Government Board approved the construction and a 20 years' loan was granted upon it.

Similar Sanatoria have been constructed at Dewsbury, Leeds, Bootle, Oldham, St. Helens, Middlesbrough, Northampton, Eastbourne, etc., and many others have been specified.

The Sanatorium illustrated has a foundation of rubble, topped with a delphstone base course, on which is placed a timber wall plate, bolted down to the walls below. Erected on this base is a timber framing of 6 in. by 2 in. battens, to both sides of which HY-RIB is attached by staples, leaving a 6 in. air space all round.

The external face is cement plastered and pebble dashed, and internally with a patent plaster on top of a cement base. All the angles are coved, the floors of pine blocks are on concrete, and the roof is of cement tiles.

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HY-RIB—Combined Centering and Reinforcement.

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SANATORIA.



Dewsbury Sanatorium. Hy-Rib Walls.



Hy-Rib Walls and Concrete Verandah.

HOSPITALS.



Queen Mary's Hospital, Sidcup, Kent.—Hayward & Maynard, Architects.
Reinforced Concrete throughout: Hy-Rib Floors, Walls and Roofs.



Queen Mary's Hospital, Sidcup Kent.
These are permanent, not temporary structures.



Laying Hy-rib Sheets for Roof of 25a, Belgrave Square.

HY-RIB ROOFS.

(For Specifications of Hy-Rib Roofs, see pages 77 to 79, also 30 & 31).

The construction of roofs is similar to that of floors, except that as the loads are lighter, a correspondingly lighter construction is admissible. In this field HY-RIB has special advantages, because it permits the use of very thin slabs. HY-RIB saves in the dead weight of the construction, and consequently reduces the weight and cost of the roof trusses.

Concrete construction has at times been rejected when desired for roofs of industrial plant, solely because of the prohibitive cost of the false-work when roofs are 20 to 50 feet above the ground. HY-RIB saves this expensive centering and can be readily and rapidly installed.

The initial cost complete of HY-RIB embedded in cement mortar is but little more than that of corrugated iron sheets, and it makes an infinitely better roof.

A roof built of HY-RIB and concrete is fire-resisting and requires absolutely no expense for maintenance.

HOW TO BUILD HY-RIB ROOFS.

Place the Steel or Wooden Rafters in position at intervals of from three to ten feet, according to Table A on page 36. The HY-RIB then placed lath-face downwards is attached to the purlins by the clips shown on page 24. Care must be taken to interlock the adjoining sheets at sides, and thoroughly to fasten them together every 21 inches and at every rib at the ends by wiring, or preferably by punching with the pincers shown on page 64. Allow laps as provided for in the Specification on page 77.

If wooden purlins are used the HY-RIB should be firmly attached to them by nails or staples, and these attachments, both in the case of wood and steel, should be made at the interlocking side splices between sheets every 21 inches along the supports where the slope of the roof is less than 10 degrees, and every $10\frac{1}{2}$ inches where the slope is more than 10 degrees.

No loads should be placed on the HY-RIB before concreting, or before the concrete is set. Runways should be provided over the supports and vibration avoided as much as possible.

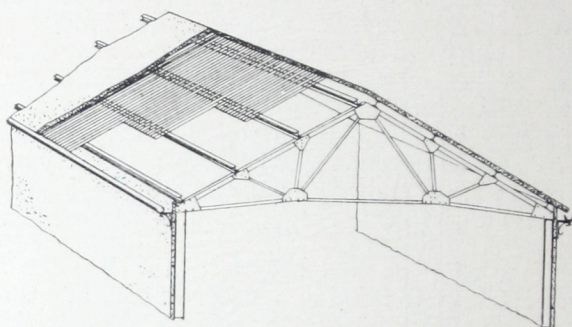
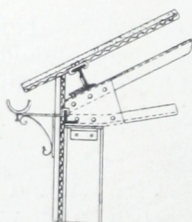
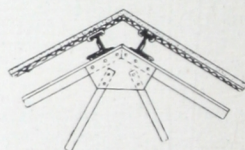
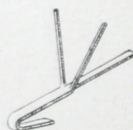
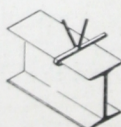
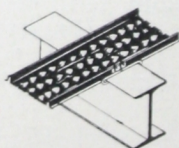
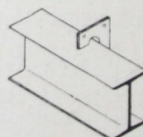
The bearing capacity of HY-RIB under wet concrete will be found in Table B, page 36. Care should be taken that when these spans are exceeded, and until the concrete has set, additional supports be used.

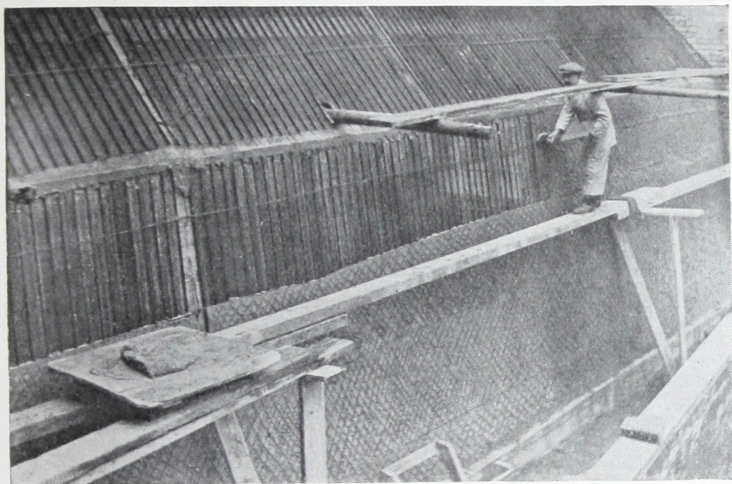
The specification of concrete to be used will be that common to floors (see pages 77 and 78), and if waterproofing is needed, paste, composition, felt, or tar-gravel roofings may be applied directly to the concrete.

For slate and tile roofs nailing strips should be provided at convenient centres.

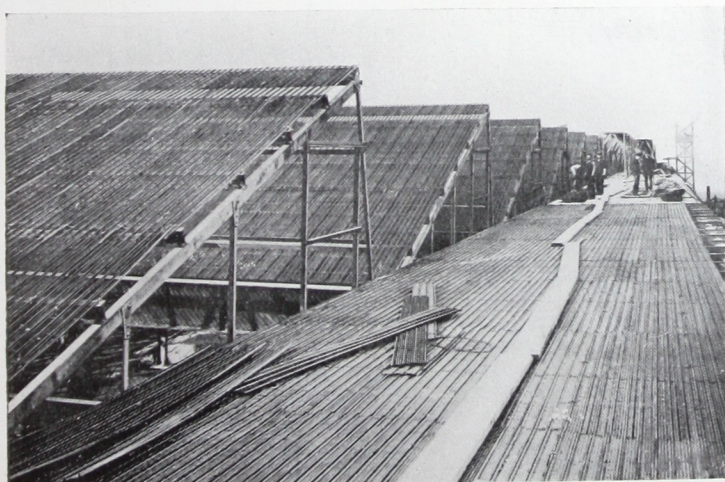
When the concrete is set the underside should be plastered to a thickness varying from $\frac{3}{8}$ in. to $\frac{1}{2}$ in. The plaster must be of the cement plaster class, as specified on page 78.

TYPICAL DETAILS FOR HY-RIB ROOFS.

*Sketch showing General View.**Detail of Eaves.**Detail of Ridge.**Rib clip.**Plate clip.**Rib clip laid on purlin ready to be knocked around flange.**Clip in position with prongs bent over rib of Hy-Rib.**Plate clip in position for rib of Hy-Rib to slip over.*



Hy-Rib Mansard Roof.—Messrs. Jones Bros., Holloway.
Shows the Hy-Rib partly plastered and rough scratched for second coat.



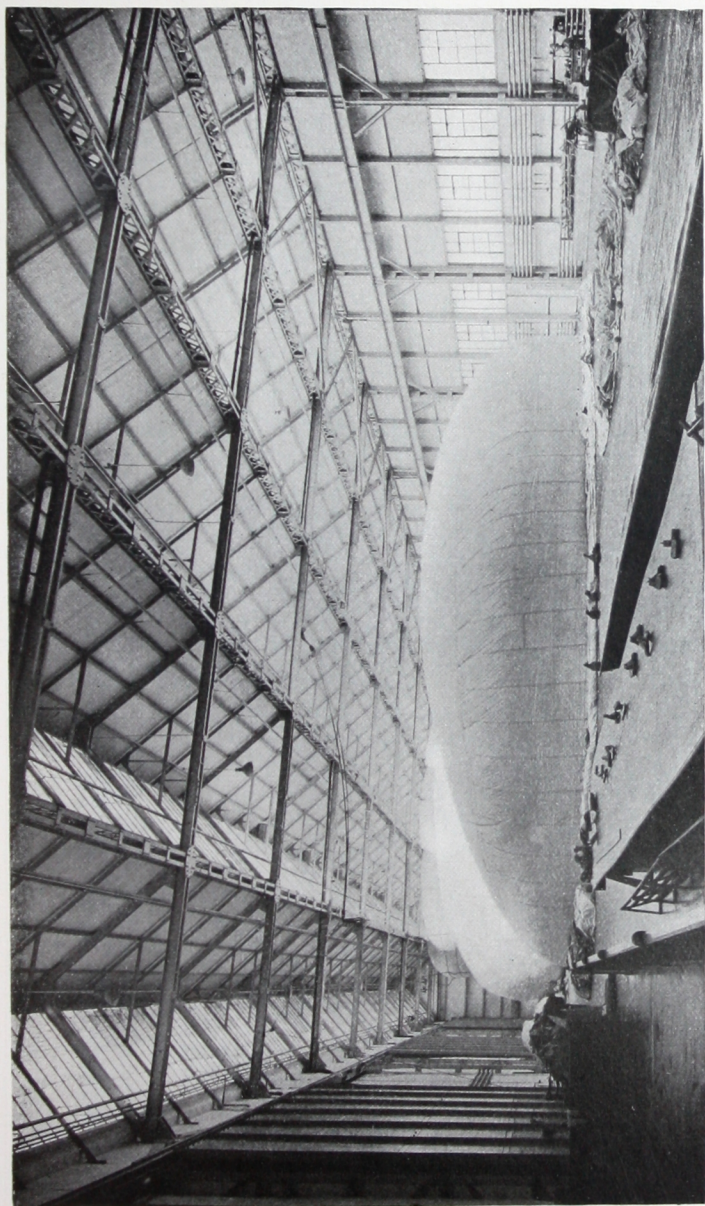
Hy-Rib North Light Saw-tooth Roof for Workshops.
Fixing the Hy-Rib. Note the complete absence of centering.



Hy-Rib Roof on Foundry—spreading the Concrete.
No forms required with Hy-Rib Concrete Roofs. Consider the great saving in falsework where Roofs are 20 to 50 feet above ground.



Hy-Rib Roof of Pavilion at Weston-super-Mare.
Hy-Rib Roofs are clean, strong and weatherproof. Practically no maintenance.

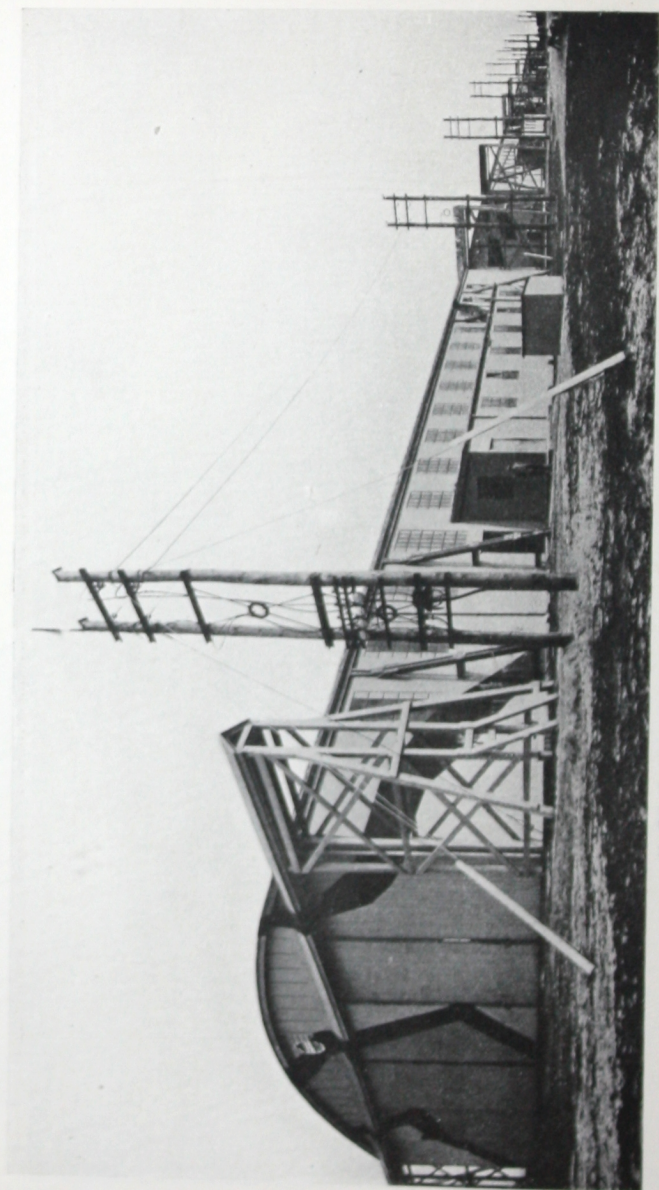


The Largest Airship Shed in the World.——Erected in Bedfordshire with Hy Rib Walls and Roof.

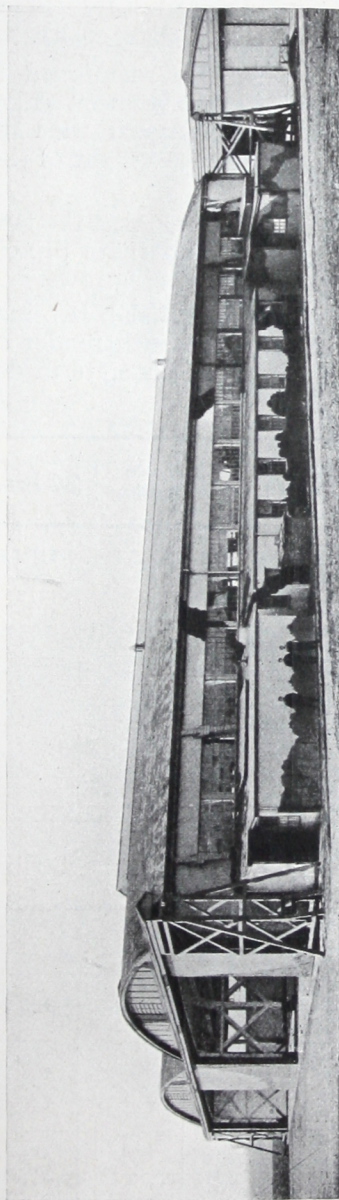
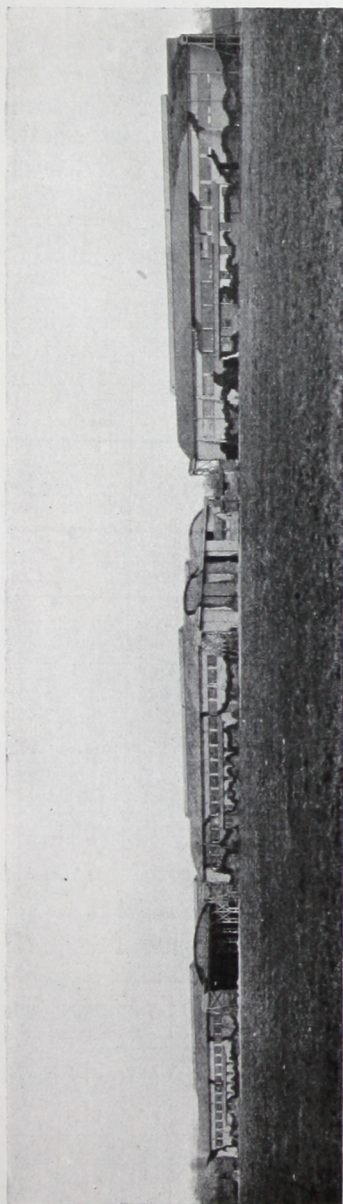
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HY-RIB—Combined Centering and Reinforcement.

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Hy-Rib Hangars within sight of France for Royal Air Force.
During the war Hy-Rib was extensively used for over one hundred of the largest aircraft sheds and hangars. Hy-Rib walls, roofs, etc. These are rigid concrete structures of great durability.



Typical Flight Service Sheds in Hy-Rib. About 170 ft. long by about 80 ft. span : concrete 2 in.—2½ in. thick.
Hy-Rib is unexcelled for large permanent sheds of this type, as in shipyards, etc.

HY-RIB ON PITCHED ROOFS.

SIZES OF R.S. JOIST PURLINS.

The R.S.J.'s mentioned below are British Standard Sections and have been calculated to carry a **superload caused by a horizontal wind pressure of 30 lbs. per sq. ft.** in addition to the weight of the concrete slab and the joist itself.

It is preferable that the purlins should have a fishplated joint at every alternate principal, and that the joints be staggered in adjoining rows.

Where a roof slab is cement rendered on the outside, the thickness of such render coat should be added to the thickness of the concrete in determining the size of purlin to be employed.

2" Slab { $1\frac{1}{2}$ " Concrete Rendering } 24 lbs. per square foot dead load.							
Spacing of Purlins.	SIZES OF R.S.J. PURLINS FOR VARIOUS SPANS.						
	10' 0"	11' 0"	12' 0"	13' 0"	14' 0"	15' 0"	16' 0"
4' 0"	$4\frac{3}{4}" \times 1\frac{3}{4}"$	$4\frac{3}{4}" \times 1\frac{3}{4}"$	$4\frac{3}{4}" \times 1\frac{3}{4}"$	$5" \times 3"$	$5" \times 3"$	$6" \times 3"$	$6" \times 3"$
4' 6"	$4\frac{3}{4}" \times 1\frac{3}{4}"$	$4\frac{3}{4}" \times 1\frac{3}{4}"$	$4" \times 3"$	$5" \times 3"$	$5" \times 3"$	$6" \times 3"$	$6" \times 3"$
5' 0"	$4\frac{3}{4}" \times 1\frac{3}{4}"$	$4\frac{3}{4}" \times 1\frac{3}{4}"$	$4" \times 3"$	$5" \times 3"$	$5" \times 3"$	$6" \times 3"$	$6" \times 3"$
5' 6"	$4\frac{3}{4}" \times 1\frac{3}{4}"$	$4\frac{3}{4}" \times 1\frac{3}{4}"$	$5" \times 3"$	$5" \times 3"$	$6" \times 3"$	$6" \times 3"$	$7" \times 4"$
6' 0"	$4\frac{3}{4}" \times 1\frac{3}{4}"$	$4" \times 3"$	$5" \times 3"$	$5" \times 3"$	$6" \times 3"$	$6" \times 3"$	$7" \times 4"$

2 $\frac{1}{2}$ " Slab { 2" Concrete Rendering } 30 lbs. per square foot dead load.							
Spacing of Purlins.	SIZES OF PURLINS FOR VARIOUS SPANS.						
	10' 0"	11' 0"	12' 0"	13' 0"	14' 0"	15' 0"	16' 0"
4' 0"	$4\frac{3}{4}" \times 1\frac{3}{4}"$	$4\frac{3}{4}" \times 1\frac{3}{4}"$	$4" \times 3"$	$5" \times 3"$	$5" \times 3"$	$6" \times 3"$	$6" \times 3"$
4' 6"	$4\frac{3}{4}" \times 1\frac{3}{4}"$	$4\frac{3}{4}" \times 1\frac{3}{4}"$	$5" \times 3"$	$5" \times 3"$	$5" \times 3"$	$6" \times 3"$	$6" \times 3"$
5' 0"	$4\frac{3}{4}" \times 1\frac{3}{4}"$	$4" \times 3"$	$5" \times 3"$	$5" \times 3"$	$6" \times 3"$	$6" \times 3"$	$7" \times 4"$
5' 6"	$4\frac{3}{4}" \times 1\frac{3}{4}"$	$5" \times 3"$	$5" \times 3"$	$5" \times 3"$	$6" \times 3"$	$6" \times 3"$	$7" \times 4"$
6' 0"	$4\frac{3}{4}" \times 1\frac{3}{4}"$	$5" \times 3"$	$5" \times 3"$	$6" \times 3"$	$6" \times 3"$	$7" \times 4"$	$7" \times 4"$
6' 6"	$4\frac{3}{4}" \times 1\frac{3}{4}"$	$5" \times 3"$	$5" \times 3"$	$6" \times 3"$	$6" \times 3"$	$7" \times 4"$	$7" \times 4"$
7' 0"	$4" \times 3"$	$5" \times 3"$	$5" \times 3"$	$6" \times 3"$	$6" \times 3"$	$7" \times 4"$	$7" \times 4"$

3" Slab { $2\frac{1}{2}$ " Concrete
 $\frac{1}{2}$ " Rendering } **36 lbs. per square foot dead load.**

Spacing of Purlins.	SIZES OF PURLINS FOR VARIOUS SPANS.						
	10' 0"	11' 0"	12' 0"	13' 0"	14' 0"	15' 0"	16' 0"
5' 0"	4 $\frac{1}{2}$ " x 13"	5" x 3"	5" x 3"	5" x 3"	6" x 3"	6" x 3"	7" x 4"
5' 6"	4 $\frac{1}{2}$ " x 13"	5" x 3"	5" x 3"	6" x 3"	6" x 3"	7" x 4"	7" x 4"
6' 0"	4" x 3"	5" x 3"	5" x 3"	6" x 3"	6" x 3"	7" x 4"	7" x 4"
6' 6"	5" x 3"	5" x 3"	5" x 3"	6" x 3"	7" x 4"	7" x 4"	7" x 4"
7' 0"	5" x 3"	5" x 3"	6" x 3"	6" x 3"	7" x 4"	7" x 4"	7" x 4"
7' 6"	5" x 3"	5" x 3"	6" x 3"	6" x 3"	7" x 4"	7" x 4"	7" x 4"
8' 0"	5" x 3"	5" x 3"	6" x 3"	7" x 4"	7" x 4"	7" x 4"	7" x 4"

(For Specifications of Hy-Rib Roofs, see pages 77 to 79).



Plastering the Hy-Rib on superstructure of elevator.

Note light steel structural frame-work and entire absence of centering.

HY-RIB FLOORS.

(For specification of Hy-Rib Floors, see pages 77 to 79).

(For Safe Loads, etc., see page 36).

HY-RIB is used in floors in conjunction with any type of beam—reinforced concrete, steel, or wood. Its use is very simple, the HY-RIB is laid over the supports with the lath side down and the concrete poured on from above. The concrete flows through the lath surface sufficiently to afford a perfect key. The plaster is applied directly to the under surface as soon as the concrete is set.

HY-RIB provides in itself the centering and reinforcement of the concrete, and thus greatly reduces the cost, simplifies the construction, and saves time in erection.

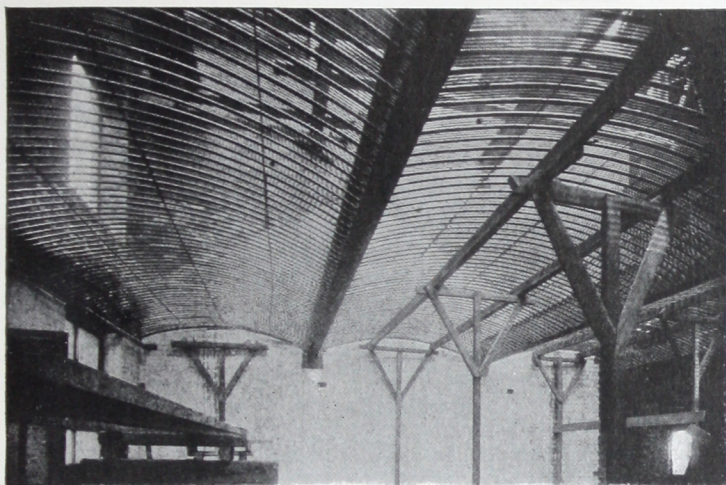


Interlocking Splice at Sides and Ends
of Hy-Rib Sheets.

HY-RIB is manufactured with a rib along each side of the sheet, making a perfect interlocking splice when two sheets are joined. A similar interlocking splice is provided at the ends by allowing the two sheets to overlap. In this way absolute continuity of strength and reinforcement is provided throughout the entire floor surface without waste of material.

Floors to carry heavy loads are frequently built of concrete in the form of an arch. For such work HY-RIB can be bent to the exact curve required, thus saving the cost of expensive circular centering.

Practical builders know that centering is the expensive and troublesome part of concrete floor construction, whether straight or curved. The erection and removal of centering always means very heavy cost nowadays in timber and time lost. Being able to lay HY-RIB on the beams and pour the concrete immediately saves time and money.

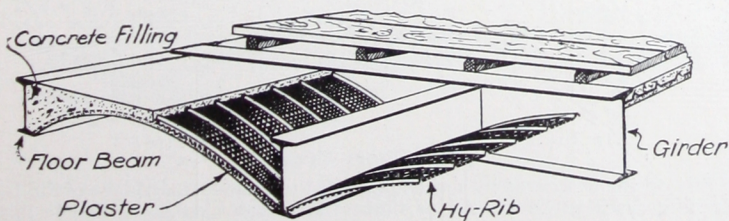


Curved Hy-Rib used as centering. Westgate Common Mills.
Note the absence of timber shuttering or falsework.

ARCHED FLOORS.

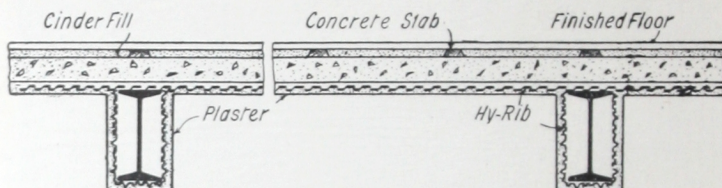
Where floors are built to carry heavy loading, such as in warehouses, power houses, etc., it is advisable to construct them in arched form. Curved HY-RIB is pre-eminent for such floors, as it provides the centering and reinforcement for the concrete, and owing to its rigidity permits longer spans and thinner concrete being used. When a flat soffit is required straight HY-RIB is attached to the underside to form a suspended ceiling.

The curving being done at the works does away with expensive labour on the site. All that is necessary is to set the HY-RIB in place and pour the concrete in the usual way, provision having been made for the necessary runways over joists, and for supports to the HY-RIB where the spans are excessive.



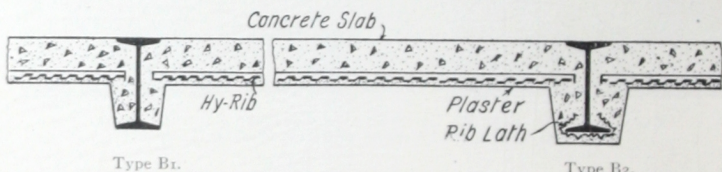
(For details of curved Hy-Rib, see page 40).

HY-RIB FLOORS.



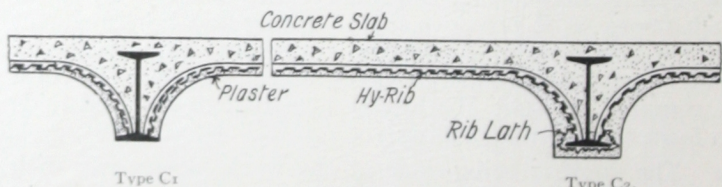
Hy-Rib Floor—Type A.

HY-RIB sheets are laid on top of steel beam, concrete poured in and under surface plastered; centering is eliminated, only temporary supports being required. Solid concrete or hollow tile may be substituted for fireproofing of steel beam.



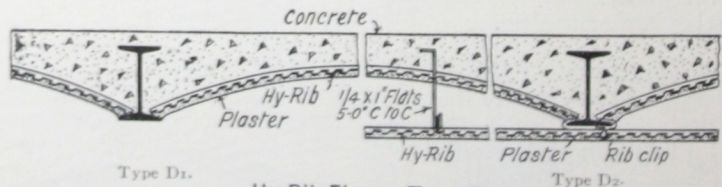
Hy-Rib Floor—Type B.

Finished concrete slab is flush with top of steel beam, giving greater head-room below beams. HY-RIB sheets are supported on the sides of beam boxes used as centering for the steel beam fireproofing. No other centering is necessary.



Hy-Rib Floor—Type C.

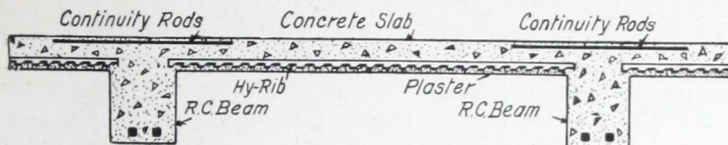
Ends of HY-RIB sheets are curved (bending done at our works) and rest on lower flange of beams. HY-RIB also provides for fireproofing of steel beams without the use of centering.



Hy-Rib Floor—Type D.

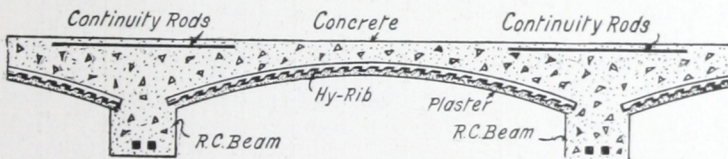
Flat ceiling is secured by suspending HY-RIB from bottom flange of R.S.'s. Existing concrete, hollow-tile or timber floors can also be treated in this manner.

HY-RIB FLOORS.



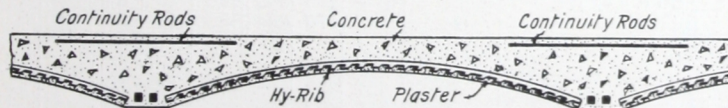
Hy-Rib Floor—Type E.

HY-RIB sheets are supported on the sides of the beam boxes used for centering to the concrete beams. All other centering is eliminated, only temporary supports being required. If HY-RIB extends over concrete beams, punch out the lathing between the ribs to permit filling of the beam.



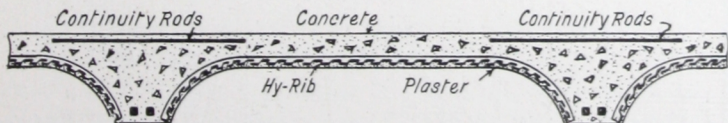
Hy-Rib Floor—Type F.

HY-RIB sheets are curved (bending done at our works) and are supported on the sides of the beams boxes as in type E.



Hy-Rib Floor—Type G.

Arched concrete floors are used for carrying heavy loads. HY-RIB comes to the job bent to exact curve. Ends of sheets rest on beam boxes. Concrete is poured in above and plaster applied to the lower surface. Centering is eliminated, only temporary supports required. No sides to beam boxes are required in Type G.



Hy-Rib Floor—Type H.

Ends of HY-RIB sheets are curved (bending done at our works) and rest on the bottom board for beam. No sides to beam boxes are necessary in types H. and G.

TABLE A.
SAFE SUPER-IMPOSED LOADS IN POUNDS PER SQUARE
FOOT FOR SLABS REINFORCED WITH 4-RIB HY-RIB.
(ENDS FREELY SUPPORTED)

Thickness of Slab = Depth of Concrete plus $\frac{1}{2}$ in. Render.	Gauge No.	SPAN IN FEET.							
		3	4	5	6	7	8	9	10
$1\frac{1}{2}$ in. Thick Slab Wt. = 18 lbs.	28	70							
	26	87	42						
	24	122	62						
2 in. Thick Slab Wt. = 24 lbs.	28	146	71	37					
	26	180	90	50					
	24	248	128	74					
$2\frac{1}{2}$ in. Thick Slab Wt. = 30 lbs.	28	216	109	59	32				
	26	265	137	77	44				
	24	364	192	112	68				
3 in. Thick Slab Wt. = 36 lbs.	28	344	178	100	59	34			
	26	420	221	125	78	48			
	24	572	306	182	116	76			
$3\frac{1}{2}$ in. Thick Slab Wt. = 42 lbs.	28	527	278	162	100	62			
	26	641	342	203	130	83	54		
	24	868	470	284	186	124	86	58	
4 in. Thick Slab Wt. = 48 lbs.	28	627	332	193	121	76	50		
	26	762	408	242	155	100	66	42	
	24	1032	560	338	262	150	104	72	50

TABLE B.
MAXIMUM SPANS FOR 4-RIB HY-RIB AS CENTERING.
To support various thicknesses of wet concrete. For greater spans
use temporary supports.

Gauge of 4-Rib Hy-Rib.	THICKNESS OF SLAB						
	1"	1½"	2"	2½"	3"	3½"	4"
No. 24	5' 0"	4' 0"	3' 6"	3' 2"	2' 10"	2' 8"	2' 6"
No. 26	4' 3"	3' 6"	3' 0"	2' 9"	2' 6"	2' 4"	2' 2"
No. 28	3' 11"	3' 2"	2' 9"	2' 6"	2' 3"	2' 1"	1' 11"

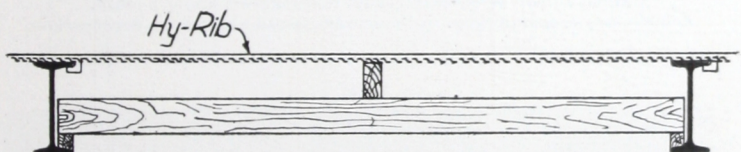
For Specifications of Floors and Roofs see pages 77 to 79.

EXPLANATION OF HY-RIB SLAB TABLES.

UPPER table gives safe superimposed loads carried by the slab after the concrete has thoroughly set. Safe loads do not include weight of slab. The lower table is used to determine the load HY-RIB will carry as centering before the concrete has set.

Example : Given a 5 ft. span to carry a safe live load of 40 lbs. per sq. ft. Use tables on page 36. Opposite 2-in. slab reinforced with No. 26 HY-RIB read 50 lbs. safe live load. The total safe load including weight of slab + $\frac{1}{2}$ in. cement plaster underneath is 74 lbs.

LOWER table shows that No. 26 HY-RIB as centering will not support the weight of 2 in. of wet concrete on 5 ft. span, but will carry it on a span as great as 3 ft. Therefore use one temporary line of shoring down the centre of the span. This shoring is removed after concrete has set.



Temporary Supports for Hy-Rib as used in Floors and Roofs—
Required only in special cases. See lower table, p. 36.

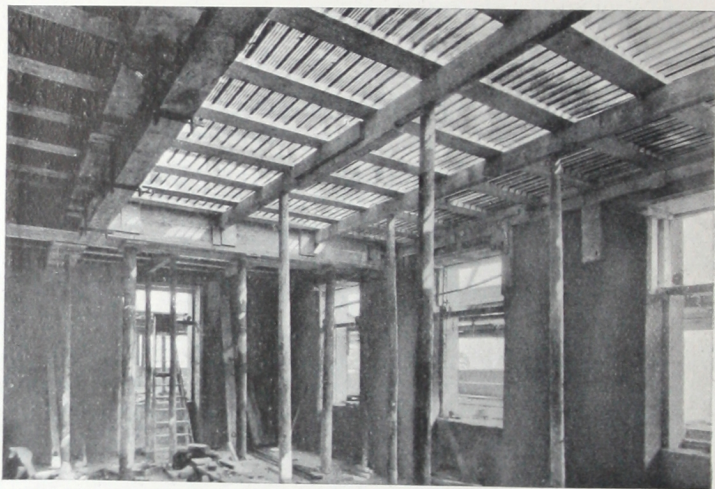
DESIGNING DATA FOR HY-RIB.

HY-RIB is manufactured from the highest grade of British open hearth acid-resisting cold rolled close annealed steel plates.

Cross-sectional areas of metal in HY-RIB per foot of width including side laps, are as follows :—

	28 Gauge.	26 Gauge.	24 Gauge.
HY-RIB ..	·165 sq. in.	·198 sq. in.	·264 sq. in.

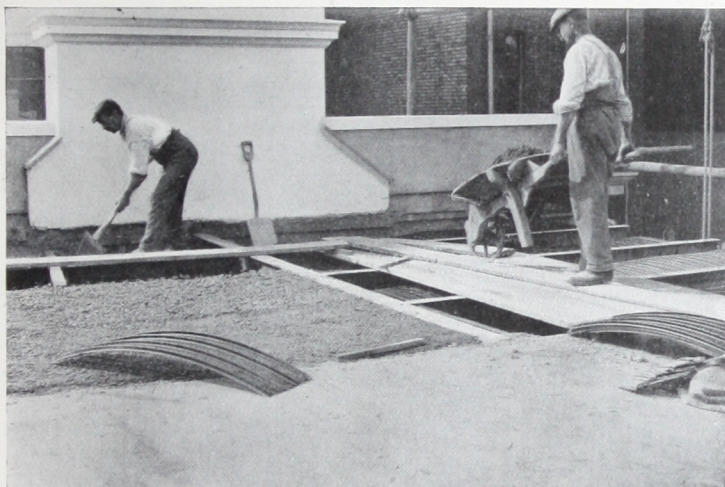
Centre of Gravity of HY-RIB Section is $\frac{3}{10}$ in. from flat side of sheet.



Ordinary floor in Hy-Rib, ready for concrete being poured.
A minimum propping only. No close-boarded shuttering necessary.



Laying the Hy-Rib for Factory Floors. On the right the
concrete has been partly poured and spread.



Concreting arched Hy-Rib Floor.

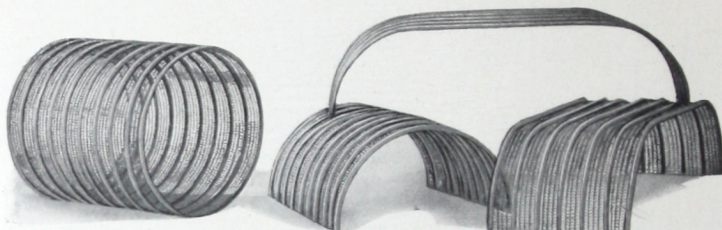
Arched Hy-Rib is simply laid between floor beams and concrete poured on.



Arched Hy-Rib Floors ready for concreting.

Hy-Rib not only eliminates expensive circular forms but provides a rigid, substantial reinforcement for the concrete.

THE CURVING OF HY-RIB FOR FLOORS, etc.



Our works are equipped with special rolls to bend HY-RIB to any desired arc or circle with radius varying from 13 inches to 20 feet. The shop bending insures absolute accuracy and smoothness of curve and avoids the necessity of expensive special labour on the site.

Curved HY-RIB effects large savings in concrete construction as it entirely eliminates the great expense of circular forms.

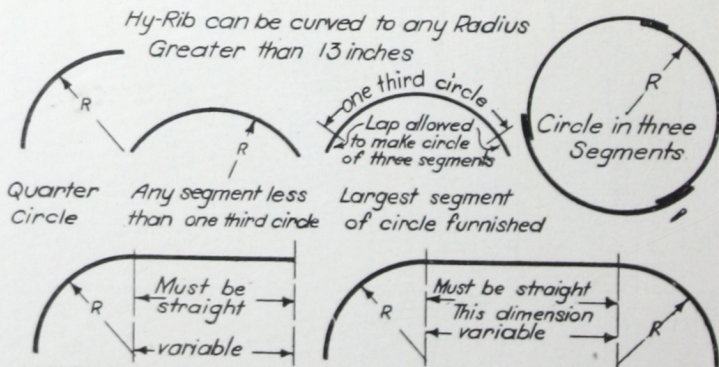
HY-RIB is supplied at small extra charge with the following types of curve :—

1st. Circular—any arc with radius between 13 inches and 20 feet, and covering any portion of a circle less than three-quarters of the whole circumference.

2nd. Central portion straight and both ends curved to the same arc.

3rd. One end of the sheet straight, the other end curved.

It is not considered advisable to use HY-RIB in circular form unless it is mechanically curved.



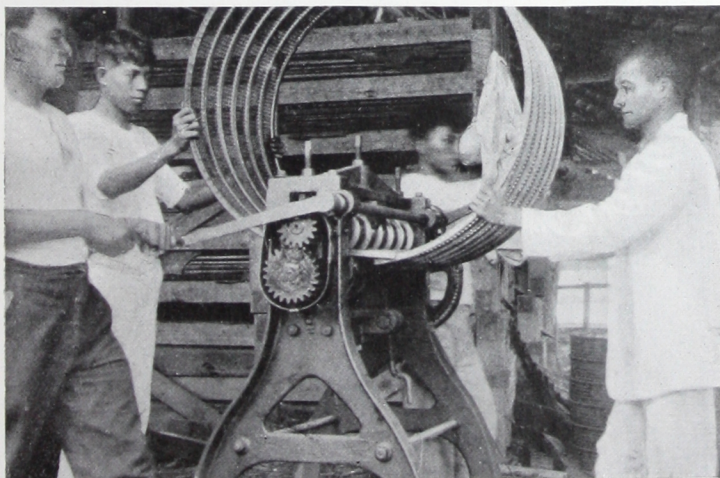
Method of Bending $\frac{13''}{16}$ Hy-Rib for Arched Floors, Circular Tanks, Sewers, Silos, etc;

OTHER APPLICATIONS OF CURVED HY-RIB.

(See also Silos on pages 57 & 58).



Hy-Rib used as Centering to Dome 25ft. diameter. Johannesburg Town Hall. Hy-Rib proved much cheaper than curved boarding.



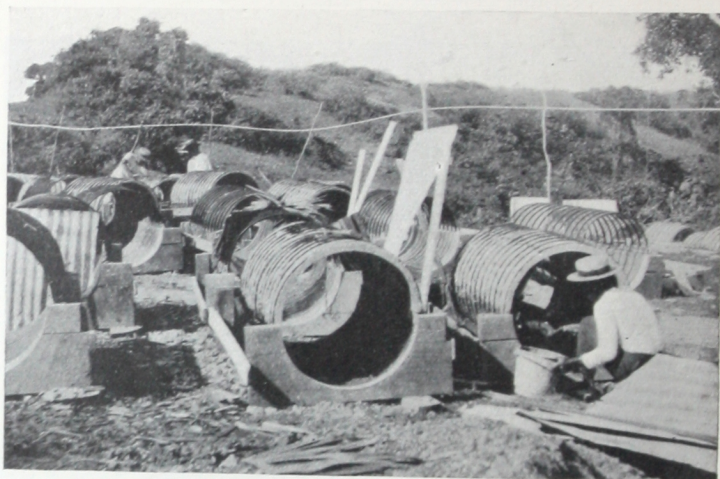
Hy-Rib Concrete Pipe Line. Curving Hy-Rib at site.

(For particulars of this Hy-Rib Bender see page 67.)

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HY-RIB—Combined Centering and Reinforcement.

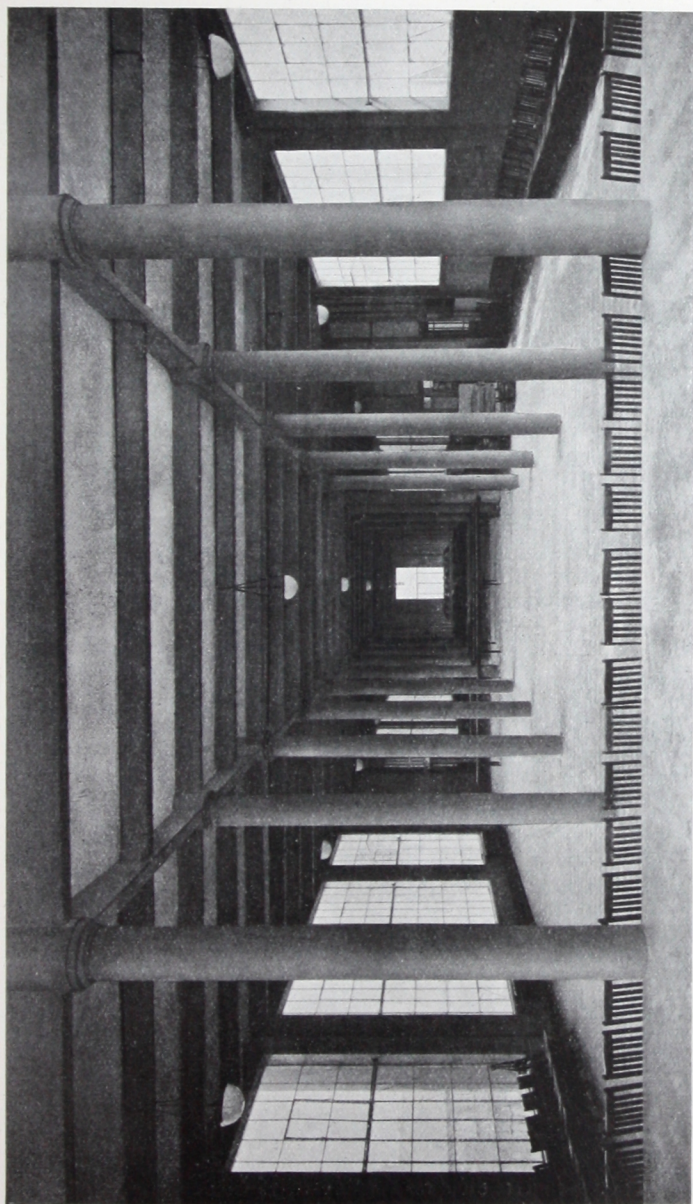
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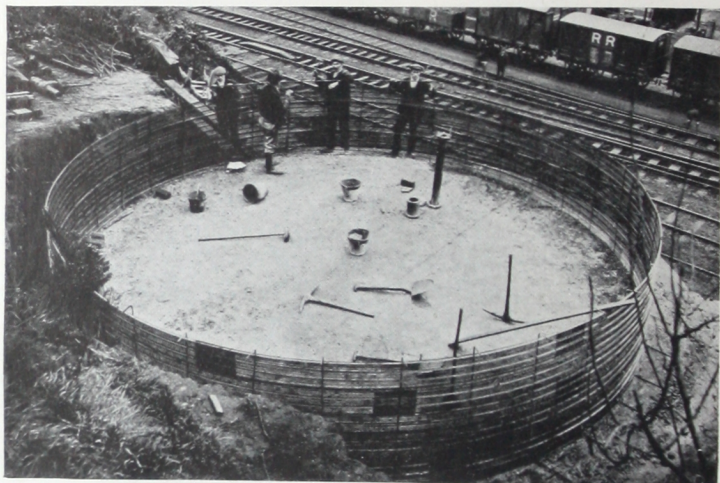
Hy-Rib Concrete Pipe Line. Plastering the inside of Hy-Rib forms with Portland cement plaster.



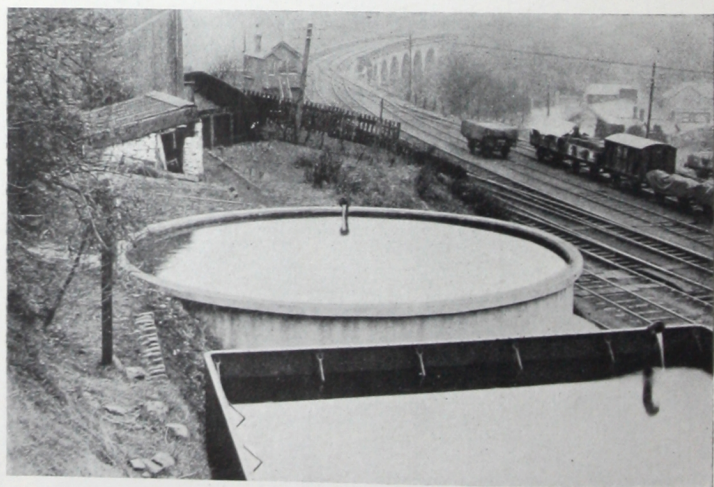
Hy-Rib Concrete Pipe Line. The finishing touch. Hy-Rib is most adaptable for reinforced concrete pipe lines.



Hy-Rib used as centering for circular columns. Dining and Recreation Hall, in reinforced concrete, canteen building for Leyland Motors (1919) Ltd. Architect, G. Mangnall Bluhm, A.R.I.B.A. For this class of work the Hy-Rib is used with the ribs vertical and therefore no mechanical bending is necessary. In addition to acting as centering, the Hy-Rib provides reinforcement to the column.



Hy-Rib Circular Tank for the Rymney Railway Co.
Note the simplicity of construction and absence of centering.



The finished tank, filled with water.
Circular tanks of all sizes and for a great variety of purposes are easily and rapidly constructed in Hy-Rib and concrete.



HY-RIB FOR SUSPENDED CEILINGS.

(For Specification of Suspended Ceilings, see page 79).

HY-RIB as used in ceilings, largely dispenses with the small channels, T's, angles and studs necessary where the ordinary type of lath is used, because the ribs of HY-RIB give the necessary stiffness and rigidity. In this way the great expense of wiring lath to a large number of separate channels is much reduced.

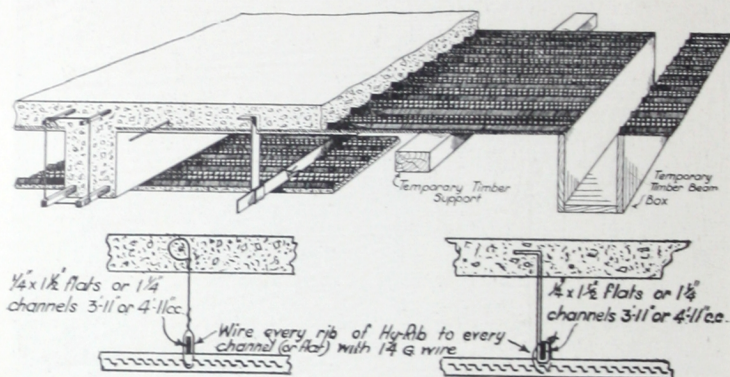
HY-RIB is placed with the lath surface downward, presenting a straight surface for plastering, and requires a minimum amount of material.

The improved form of lath provides a perfect key for the plaster and prevents any chance of its dropping.

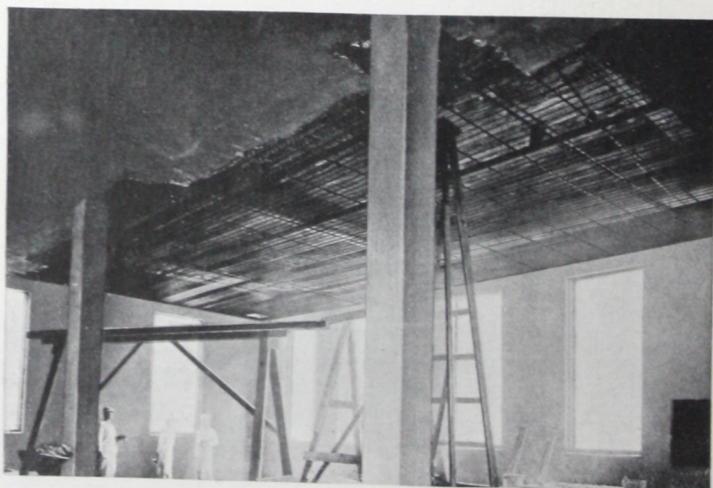
HY-RIB sheets are supported every 4 or 5 feet (as per table, page 79) either directly from the construction above or by means of lines of Flats, Ceiling Joists, Channels, or T's.

HY-RIB for ceilings saves time and labour in installation, and its initial cost is lower than would be the case if ordinary metal laths were used. Those builders who have experienced the difficulties of erecting ordinary lath and of straightening it out will best appreciate the advantages of HY-RIB which is delivered in straight and rigid sheets.

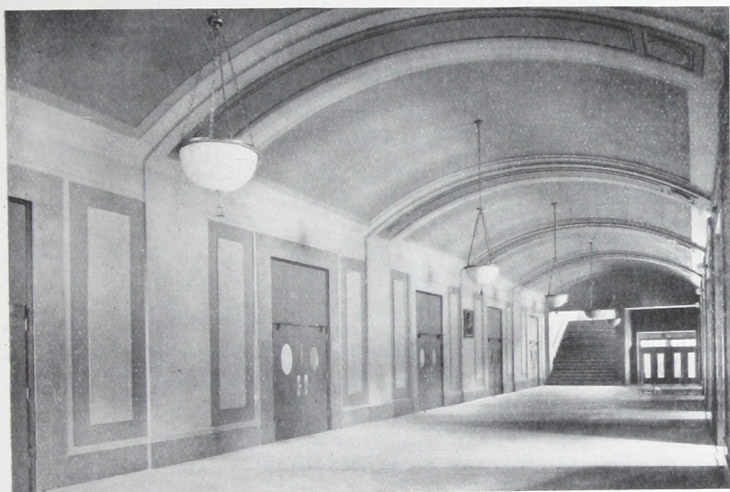
HY-RIB CEILINGS.



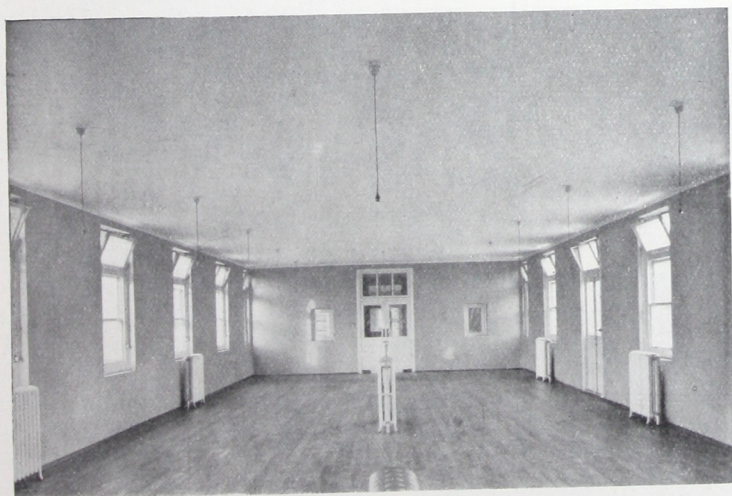
Hy-Rib for Suspended Ceilings



Suspended ceiling in Hy-Rib partly plastered.
Hy-Rib ceilings are perfectly flat on the underside, and have great strength and rigidity.



Hill Memorial Hall—Hy-Rib Ceiling.



Wimbledon Hospital—Hy-Rib suspended ceiling.

(For Specifications for Suspended Ceilings, see page 79).

HY-RIB PARTITIONS.

(For Specification of Hy-Rib Partitions, see page 80).

HY-RIB Partitions are fireproof, sound-proof, rapidly put up, and economical both in cost and space. Being only about $2\frac{1}{2}$ in. thick, partitions in HY-RIB mean considerable gain in floor area in a building.

For solid partitions built either with cement or lime plaster, HY-RIB is especially suitable as reinforcement. The ribs of the HY-RIB take the place of the studs which are otherwise necessary, and do away entirely with the expense and labour of attaching sheets of lath to studs.

Simply set up the HY-RIB, plaster both sides, and the partition is complete. No centering or supporting studs are necessary. Thin partitions of great strength and rigidity are rapidly constructed in this way.

HY-RIB presents a flat surface to work against, assuring ease and speed in plastering. Partitions so made require a minimum amount of plastering material, because the special nature of the key in HY-RIB retains the plaster instead of allowing it to pass through and drop down the other side.

For hollow partitions two thicknesses of HY-RIB are used, separated by means of Rib Studs. The sheets are placed with the rib side outwards and the plaster is applied to the desired thickness.

HY-RIB is most economical for partition work, doing away with expensive labour. The sheets are flat and stiff, and partitions of any width can be constructed without waste because one sheet laps upon another, as illustrated on page 32, saving plaster, providing increased rigidity, and saving time in erection.

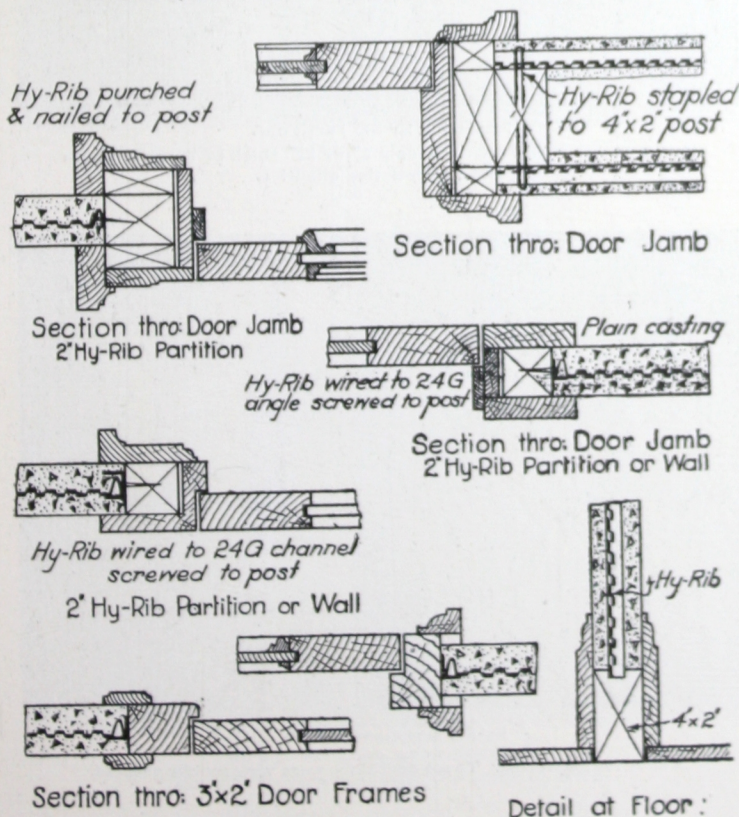
No patent plaster should be used for the first coat of a HY-RIB partition. Any good specification may be adopted, but in practice it has been found that good results are obtained with a four and one mixture of cement plaster (referred to on page 76). The finish coat may be anything desired. The lath or underside of the ribs should always be plastered first.

No studding is required for HY-RIB partitions, but the HY-RIB is attached at the top, bottom, and sides as shown in the illustrations on page 49, by means of

channels, angles, staples, or the other attachments shown. Horizontal wooden strips should be provided for each 5 ft. of height to give temporary support while plastering proceeds, and this should be wired to the HY-RIB as shown on page 52, and these strips are removed when the three coats have been applied to the HY-RIB side and is set. In most cases HY-RIB is erected vertically for inside partitions. Picture Rails, Mouldings, Skirting Boards, etc., may be applied to HY-RIB Partitions by bolting through the necessary timber before the plaster is applied or subsequently by nailing. When the plaster is thoroughly set, partitions of 2 in. and upwards may be plugged in the ordinary way if a good cement plaster has been used.

(For Specification of Partitions see page 80.)

DETAILS OF HY-RIB PARTITIONS.





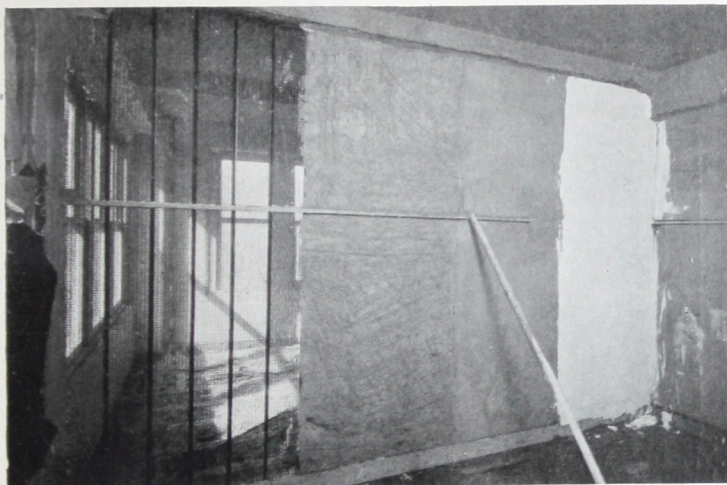
Plastering Hy-Rib Partitions.

Hy-Rib makes rigid Partitions only 2" or 2½" thick of great strength and fire-resisting qualities.

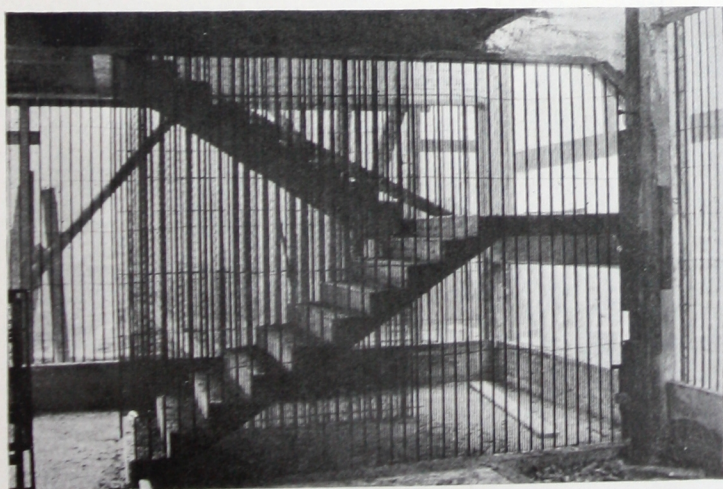


Hy-Rib partitions in Hotel.

Ready for plastering. These partitions were very rapidly erected.

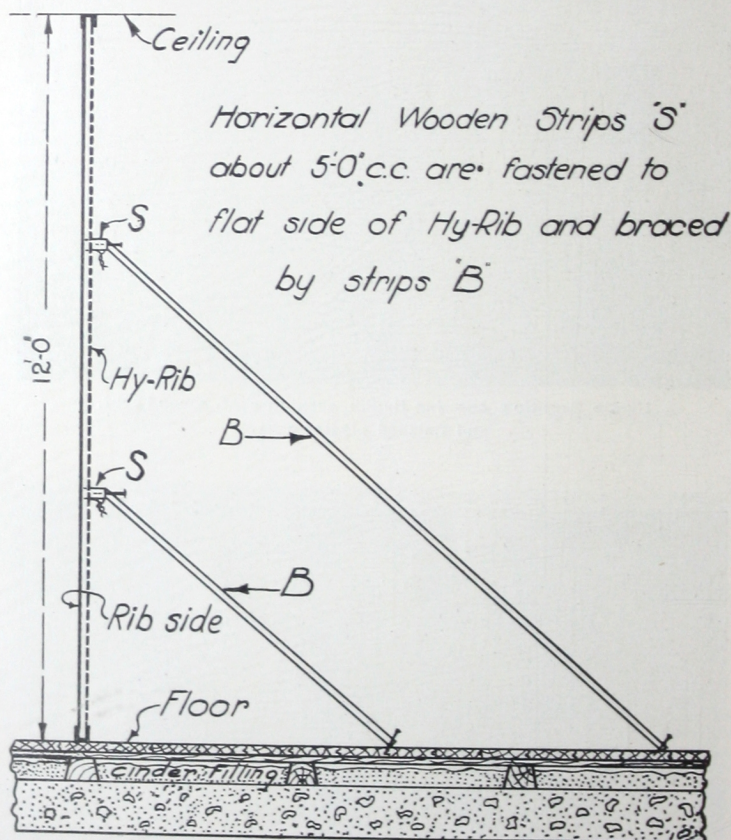


Hy-Rib Partition, showing Hy-Rib. scratch coat, second coat, and finished plaster coat.



Hy-Rib Partitions, enclosing stairs.
Fireproof, sound-proof, and economical in space.

TEMPORARY BRACING FOR HY-RIB PARTITION.



This bracing is removed after the plaster, applied to rib side, has set. No other bracing is required.

(For Specification for Hy-Rib Partitions, see page 80).

HY-RIB FOR FURRING OR OVERCOATING.

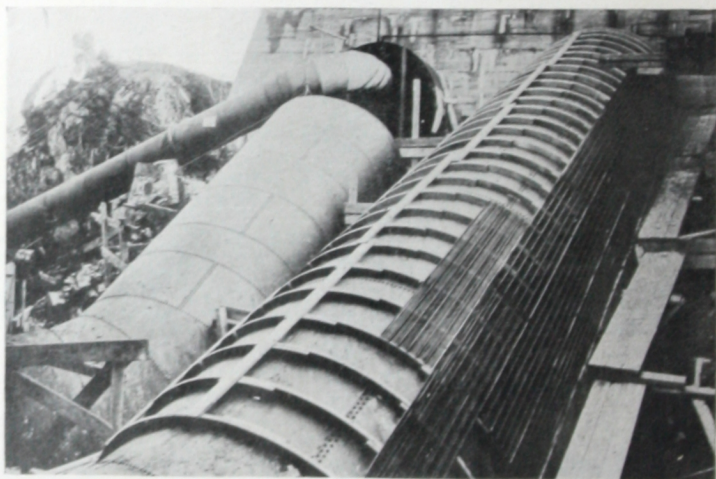


Hy-Rib may be nailed or stapled direct to wall with lath-side outwards, thus dispensing with battens. The ribs then act as studding and give an insulating air space of $\frac{3}{4}$ ".



Hy-Rib as Furring. The old house made new again, totally enclosed in a reinforced concrete shell.

HY-RIB USED FOR INSULATION AND PRESERVING.



Steel Penstock protected by applying wood strips, attaching Hy-Rib and plastering with cement, eliminating heavy concrete casing and forms. No mechanical bending of the Hy-Rib when ribs are longitudinal as above.

HY-RIB is extensively used as a furring for isolation around boilers, large diameter pipe lines, in cold storage plants and on roofs to prevent condensation.

The air space arrests conduction of heat, cold, and moisture.

Enclosed thus in a reinforced concrete cover the life of the pipe, etc., is greatly prolonged.



Hy-Rib Cattle Station at Pirbright.

HY-RIB FOR THE FARM, ETC.

The need for more durable and hygienic farm buildings of every class is more easily satisfied when HY-RIB construction is adopted. The range is so wide that to illustrate it would require a book to itself, and it may, therefore, be sufficient to say that HY-RIB has been used extensively for the construction of Barns, Cow Stalls, Piggeries, Cisterns, Dipping Vats, and buildings of almost every class required in connection with the farm. Designs of all or any of these will be gladly furnished on application. The method of application as already outlined elsewhere will apply. Sand and stone or gravel is generally to be had in the neighbourhood of any contemplated construction, and HY-RIB is so simple that the local plasterer can do all that is required. HY-RIB used in your work means the certainty of protection against fire, besides permanence and absence of maintenance charges.

HY-RIB FOR SILOS, ETC.

Curved HY-RIB sheets are set up on edges and the plaster applied directly to the inner and outer surfaces. No centering of any kind is required. Vertical Rib bars about 5 feet apart should be used to serve as a guide for the HY-RIB sheets and thoroughly to tie the concrete work together vertically.

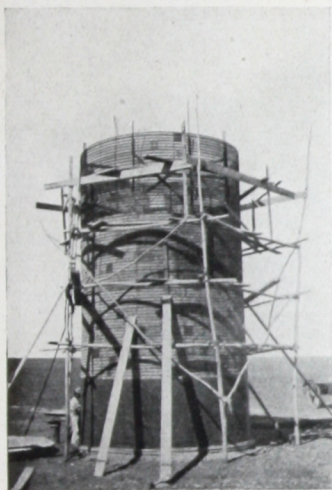
HY-RIB sheets provide in themselves complete interlocking splice at the ends and sides. Lap the sheets at least 8 inches at ends and securely fasten together each spliced rib. Splices in adjacent rings should be at least 2 feet apart.

Follow the specifications for HY-RIB walls on page 75 for materials and application of plaster.

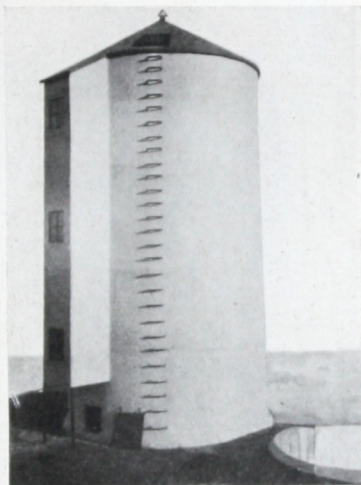
Solid walls of a greater thickness than 4 inches are not recommended, and when heavier walls are required a double layer of HY-RIB should be used, the concrete being poured in between the two sheets.

Where an air space is desired on walls of silos an inner and outer layer of HY-RIB is used with Rib steel studs to separate them. The inner wall is plastered on both sides and the outer wall on the outside only.

The roof also of a silo can be built of concrete, and in this way a permanent silo secured at a cost to-day generally less than the ordinary short-lived wood construction.



Under construction.



Finished.

Hy-Rib Silo at Middleburg.

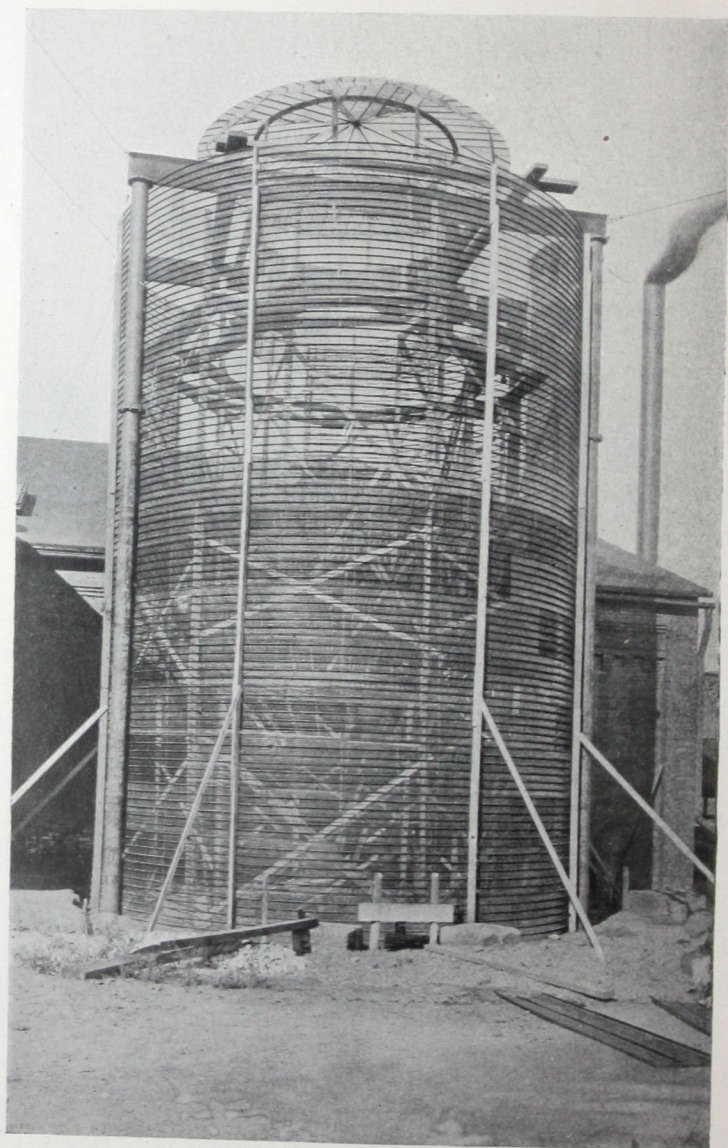


Hy-Rib Grain Tanks.

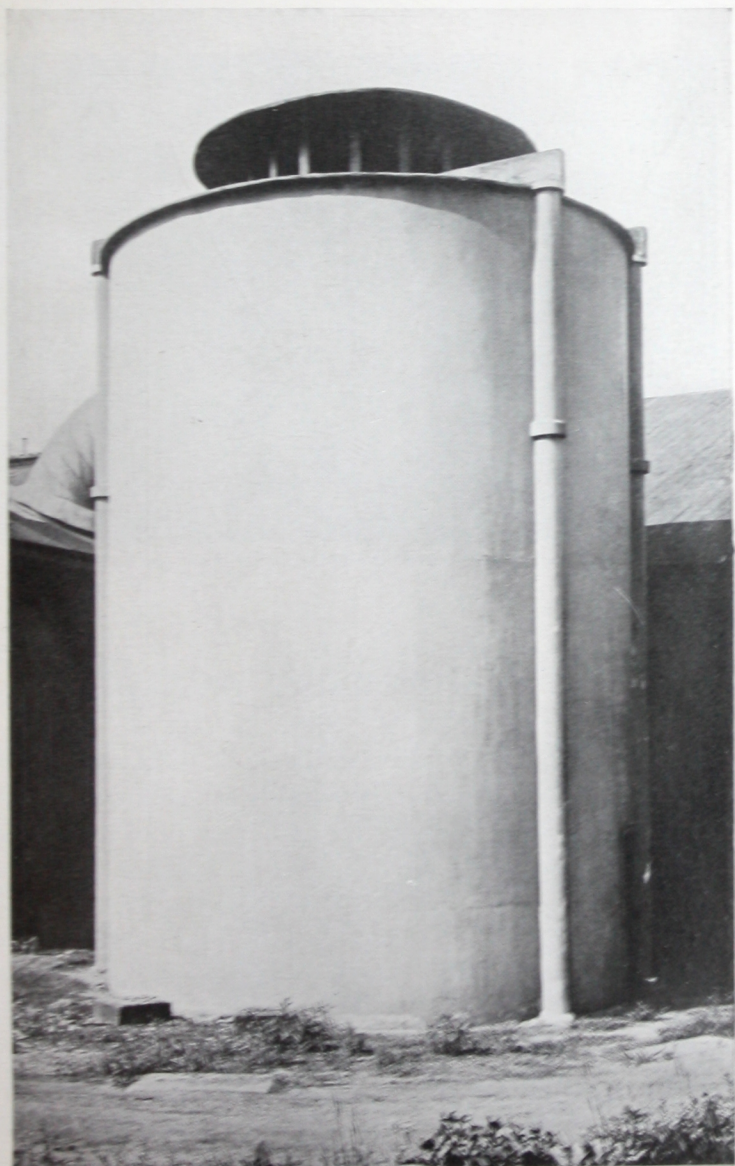
Hy-Rib is eminently suited for circular work of all kinds. Hy-Rib being itself the centering, the great expense of circular forms is eliminated.

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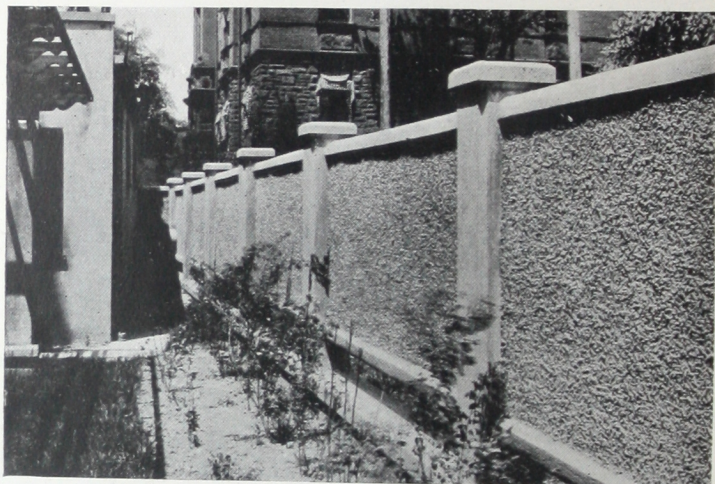
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Hy-Rib Dust Collector. Owosso Sugar Co.
Note the complete absence of timber shuttering or falsework.



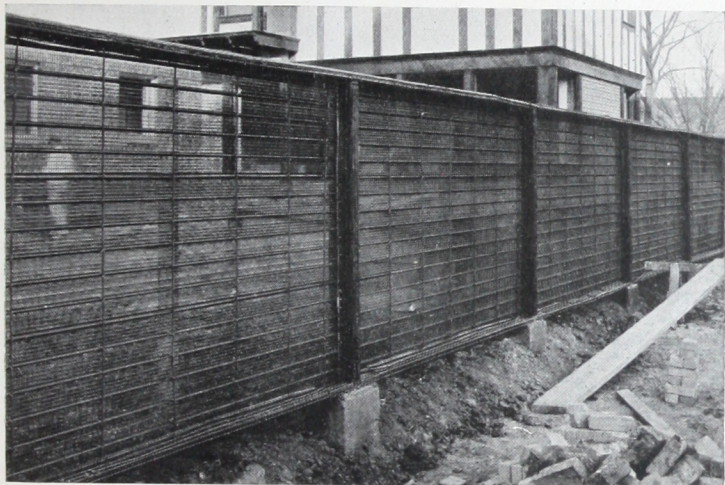
Hy-Rib Dust Collector, as opposite : plastered and finished.



Hy-Rib Wall for Mr. E. J. Smith.

HY-RIB BOUNDARY WALLS.

HY-RIB concrete walls can be built quite easily and economically. Comparing favourably in cost with most forms of construction, they can be built to any reasonable height, and may be used in conjunction with either steel or reinforced concrete supports. The HY-RIB is attached to the stanchions by means of special clips, and is plastered back and front to a total thickness of 3 inches. Walls of varying resistance may be built in designs, ornamental (as above with rough cast panels) or otherwise, and many such have been constructed in different parts of the country. For garden enclosures and similar purposes a light design would be very suitable.



Hy-Rib Boundary Wall before the cement plaster is applied.



Hy-Rib Wall at Greenwich.



Hy-Rib Garage at Bradford.

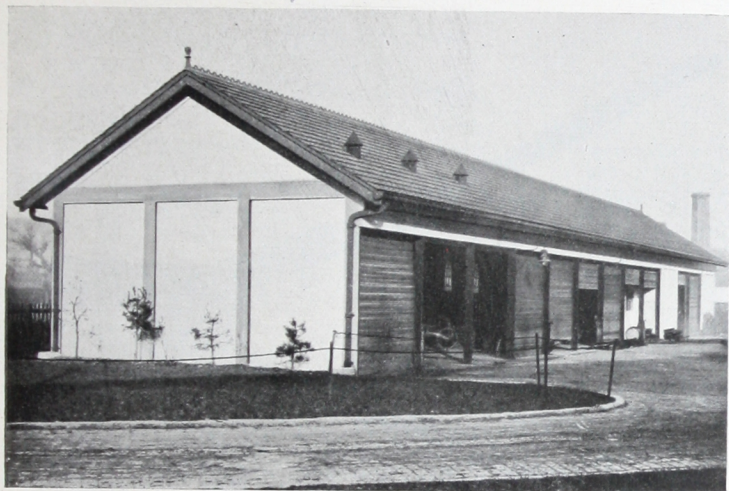
HY-RIB CONCRETE GARAGES.

The Hy-Rib garage is one that should appeal to anyone desiring a neat fireproof building. The two examples here shown are of steel frame work. Wood studding and joists may be used if desired. For the garage illustrated and others standard drawings can be supplied, or drawings for any particular design.

The construction being on the same lines as any wall and roof, the general directions for the building of walls and roofs will apply. Each individual case will, of course, call for a little different method, but no more so than if timber were used throughout.

Any type, design or size of garage can be economically built with Hy-Rib construction.

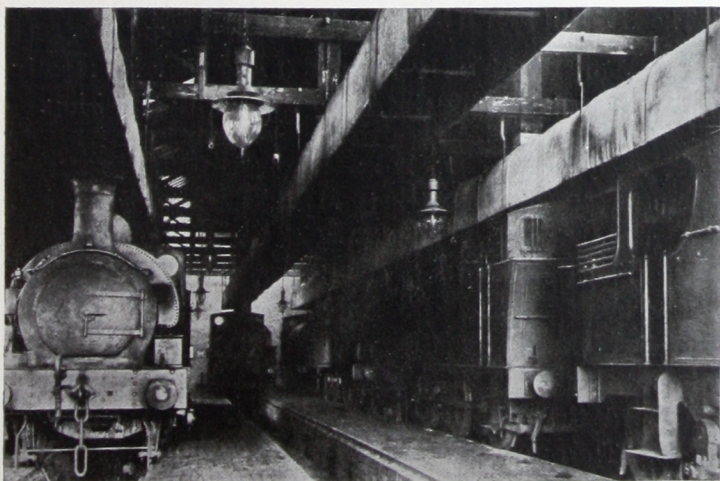
The examples illustrated are isolated constructions, but garages as adjuncts to existing buildings can be designed just as easily and economically.



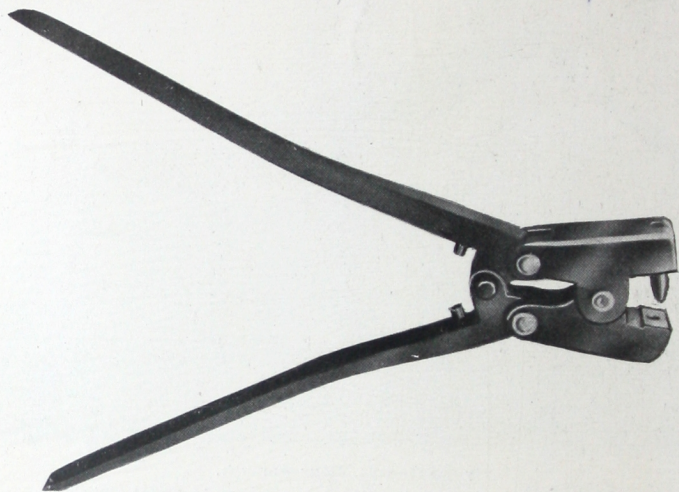
Hy-Rib Garage, Bournemouth.

A Hy-Rib Garage, in addition to being fire-resisting, is a neat and clean construction.

HY-RIB SMOKE SHUTES.



These Hy-Rib smoke shutes at the Rhymney Railway Co.'s engine sheds DO NOT CORRODE: they cannot, because they are in effect reinforced concrete, the Hy-Rib being totally enclosed in cement plaster.



HY-RIB PUNCH.

The HY-RIB Punch has two uses :—

1st.—For fastening HY-RIB sheets together by merely clamping the interlocking ribs, doing away with all wiring.

2nd.—For punching holes through the ribs when HY-RIB is attached to structural steel with plate clips. The edge of the punch is lined up with the edge of the plate clip attaching the HY-RIB to the steelwork as illustrated on the opposite page. The small point of the punch engages in the hole of the clip and thus perfectly aligns the hole in the HY-RIB with that in the clip. A short piece of wire or a nail slipped through the hole fastens the HY-RIB rigidly in place. The operation is very rapid and simple, and much less expensive than wiring HY-RIB to steel work.

DETAILS OF CLIP CONNECTIONS.

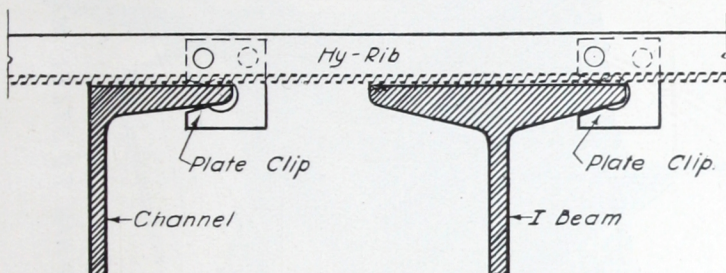


Plate Clip Connection with Hy-Rib Floor or Roof Construction

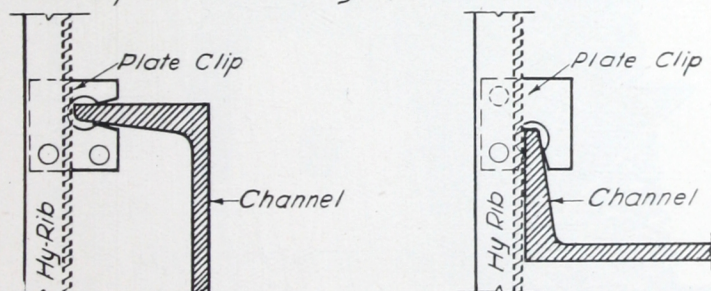


Plate Clip Connection with Hy-Rib for Wall Construction

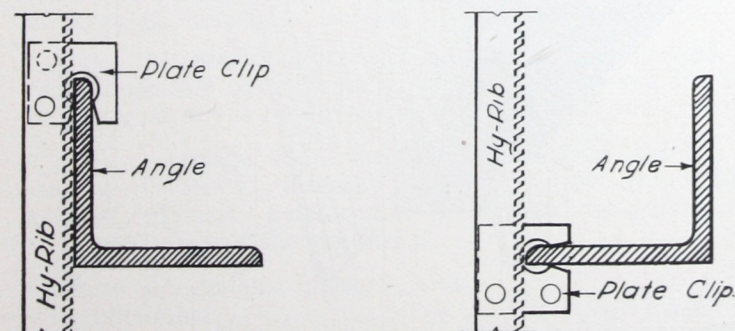
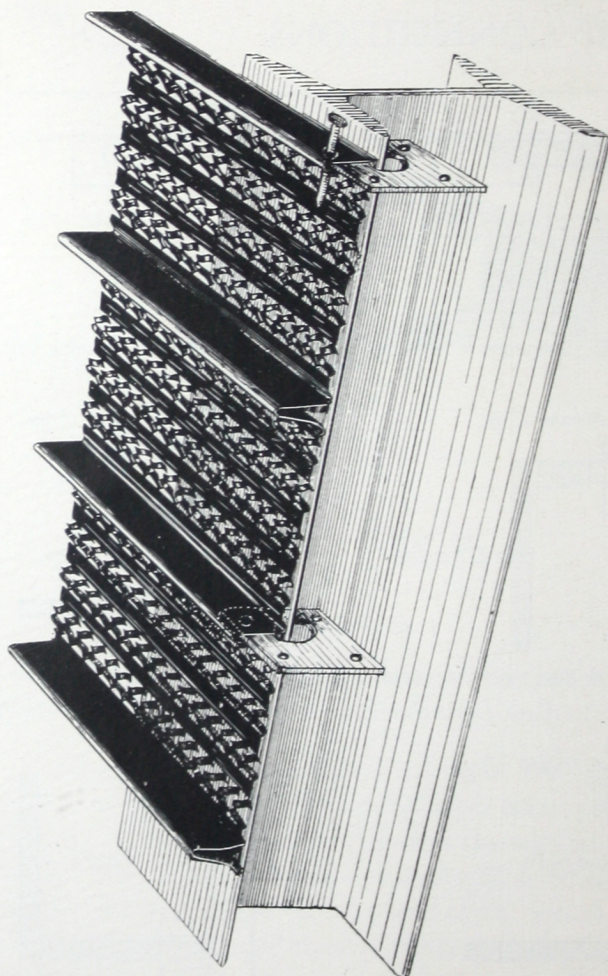


Plate Clip Connection with Hy-Rib for Wall Construction

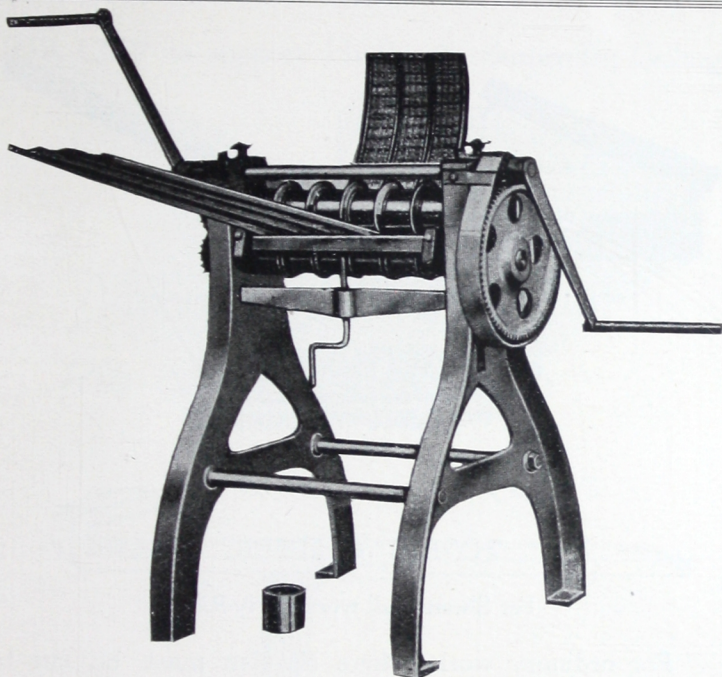
(See also page 66.)



METHOD OF USING PLATE CLIPS FOR FIXING HY-RIB TO STEEL MEMBERS

These clips are made of spring steel and when driven on to the flange of the steel-work bite into the steel, gripping like the jaws of a vice. The Hy-Rib is secured by passing a short strand of wire or a nail through hole in plate clip and through the Hy-Rib. This is a simple, rigid, and inexpensive method of attaching Hy-Rib to structural steel.

Plate clips should be placed at the interlocking overlap of the sheets.



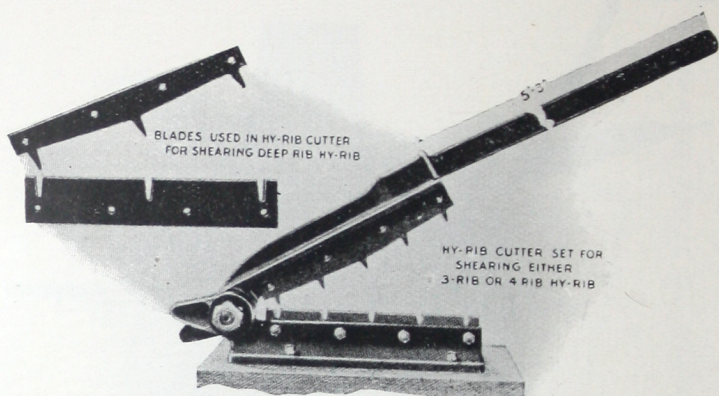
HAND-POWER HY-RIB BENDER.

The Bender illustrated is readily operated by two men, and curves HY-RIB to any circular arc with radius between 13 inches and 20 feet.

As the machine is light and easily transported its advantages are obvious where delivery of curved HY-RIB in any quantity is required at a distance from our works.

The carriage (or freight when shipped abroad) of curved HY-RIB is largely added to because the smaller quantity of sheets which can be packed per case add greatly to cubical area of the shipment.

Outside dimensions, packed and assembled	..	40" × 34" × 46"
Outside dimensions, packed but not assembled	..	46" × 34" × 16"
Approximate net weight, uncrated	..	455 lbs.
Approximate gross shipping weight	..	650 lbs.



HY-RIB CUTTER.

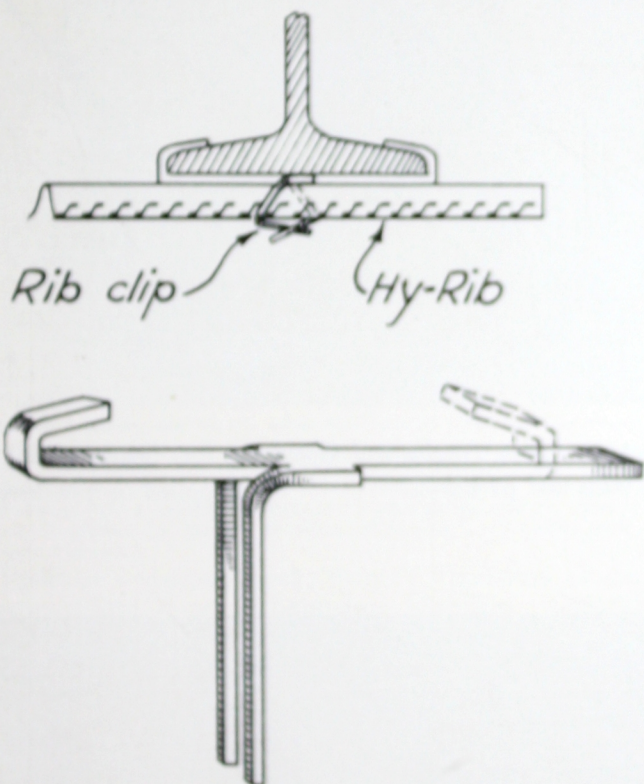
For Shearing all types of Hy-Rib.

For ordinary work, where HY-RIB must be cut to various lengths, and fitted around openings, most builders find it is more economical to order HY-RIB in standard lengths, and cut the sheets to the required size on the job.

The HY-RIB Cutter is a portable shear for cutting HY-RIB sheets to any desired length. It weighs but little, and can be readily carried by one man from one position to another. In jobs of any size the HY-RIB Cutter pays for itself many times over. It saves time, labour and expense over the use of the ordinary tinsmith's tools. Many of our representatives have HY-RIB Cutters that they can rent for use on small-sized jobs.

HY-RIB Cutters are furnished complete, ready for mounting on suitable base. The shear blades are detachable for sharpening.

RIB CLIP to support Hy-Rib in Suspended Ceilings.



RIB CLIPS, AS USED FOR
SUSPENDED CEILINGS, ROOFS, &c.

Rib Clips are delivered with one end bent and other end indicated above.

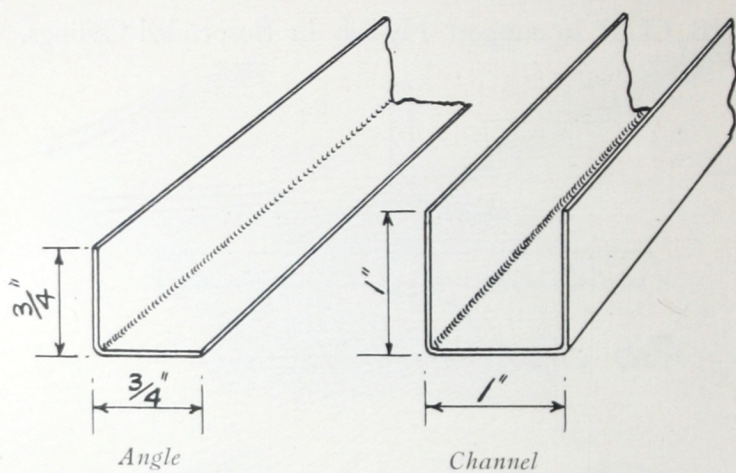
They are bent around the steel members while the two forks are turned through the HY-RIB and bent over as illustrated above.

When ordering these Rib Clips always state the width of flange upon which the clips are to be used or give the size and weight of channels or I beams.

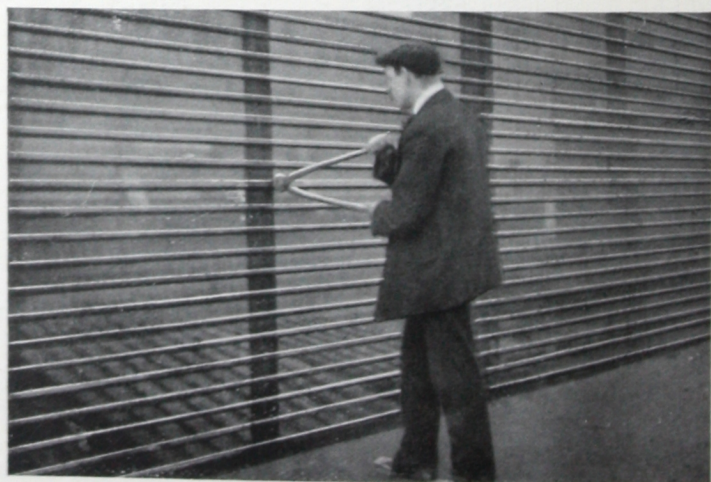
::

HY-RIB—Combined Centering and Reinforcement.

::



24-Gauge Fixing Angles and Channels for fastening Hy-Rib walls and partitions.
Supplied in 5-ft. lengths.



Punching Hy-Rib in position.



Load of 1,400 lbs. per sq. ft. after Fire Test of 1700° for four hours.

NEW YORK FIRE TEST ON HY-RIB ARCH.

(Compiled from official report of Fire, Load and Water Test made upon cinder concrete floor arches at Columbia Fire Testing Station, New York. Test was conducted by Ira H. Woolson, E.M., in co-operation with City Buildings Bureaus.)

Span of segmental arch, 8 feet ; thickness at crown, $4\frac{1}{2}$ inches ; total depth at haunches, 15 inches. Concrete—Portland cement 1 part, sand 1 part, unsifted cinders 6 parts.

The concrete floor arch reinforced with HY-RIB was subjected to a continuous fire below the floor for four hours at an average temperature of 1700 degrees F., floor carrying at the same time a distributed load of 150 lbs. per square foot. At the end of the four hours the under side of floor while still red hot was subjected to a $1\frac{1}{2}$ inch stream of cold water for five minutes. Then the upper side of the floor was flooded and afterwards the stream was again applied on the under side for five minutes.

After cooling, the arch was subjected to a load of 600 lbs. per square foot. Later a 6 ft. wide section was cut out of the floor arch and this section was loaded to 1400 lbs. per square foot. Under this severe load the deflection was only $\frac{1}{4}$ inch.

As a result of this test the Building Departments of Manhattan and Brooklyn have approved the use of cinder concrete arches reinforced with HY-RIB, 4 inches thick at the crown, for loads up to 350 lbs. per sq. ft. and span of 8 feet.

TESTS.

Load Test of Hy-Rib Slabs at the British Museum.

(Extract from "The Builder.")

On April 14th last two slabs were tested at the British Museum extension works, with the object of ascertaining the practical value of HY-RIB. The lathing, in itself, constitutes the centering for floor slabs, and also acts as reinforcement, obviating the cost of timbering, and considerably reducing the time necessary for construction.

Although the perforations allow a certain proportion of the concrete to pass, the amount is very little more than that needed to form a good bond. The latter point is one which we had an opportunity of verifying on the occasion of our visit to the British Museum test, as sheets of paper had been spread beneath both slabs to receive drippings from the reinforcement at the time of moulding, and were still in position for inspection by those present.

Slab No. 1 was formed of concrete having an aggregate of boiler clinker, and slab No. 2 was made with Thames ballast concrete, the proportions in each case being one part of Portland cement, two parts of sand, and three parts of aggregate.

The reinforcement of both slabs consisted of sheets of No. 24 Gauge HY-RIB.

The loading consisted of blue bricks stacked so as to avoid arching as far as practicable, and measurements of deflection were taken at frequent intervals in the case of slab No. 1.

Comparatively little attention was devoted to slab No. 2, for the simple reason that it soon became evident that the limited headroom available would not permit even the weaker of the two slabs to be tested to destruction.

The following is a brief note of the results obtained during the testing of slab No. 1 :—

266 lbs.	..	..	..	..	1-32 in.
324 lbs.	..	..	..	..	1-16 in.
440 lbs.	..	..	..	..	3-32 in.
673 lbs.	..	..	..	..	1-8 in.
1,080 lbs.	..	..	..	..	5-32 in.

Under nearly five times the calculated safe load the slab showed very little deformation, and we may add that no indications of incipient cracks could be detected in the concrete.

LOADS CARRIED BY ARCHED HY-RIB FLOORS.

Arched Concrete Floors are capable of carrying very heavy loads, as has been frequently demonstrated in actual tests. (See New York Fire Test, page 71.) Curved HY-RIB is an ideal type of combined centering and reinforcement for arched floors. Expensive circular forms are eliminated and the HY-RIB curved at our own works is exceptionally economical in placing and handling. Curved HY-RIB sheets have far greater stiffness as centering than straight sheets, thus permitting a wider spacing of temporary supports.

The theoretical design of arches assumes absolutely rigid abutments. The thrust per lineal foot may then be figured by means of the following formula :

$$T = \frac{1.5 \text{ WL}^2}{R}$$

Where T=thrust per lineal foot,
W=the load per square foot,
L=span in feet between supports, and
R=rise of the arch in inches.

The crown thickness may be determined by the following formula :

$$C = \frac{T}{12S}$$

Where C=the crown thickness in inches,
T=the thrust per lineal foot, and
S=the allowable fibre stress per sq. inch.

In actual building construction it is practically impossible to secure absolutely rigid abutments unless tie rods are used, and the crown thickness must therefore be materially increased over the depth determined by the above formula. Minimum thickness 3 inches.

There is no question that an Arched Concrete Floor is capable of carrying considerably more load than a flat slab of the same thickness. For loads on flat slabs, see pages 36 and 37.

Our engineers have had wide experience in the design of arched floors under varying conditions. We should be glad to submit our detailed suggestions on the design of arched floors to meet any particular condition.

SOUND TESTS.

THE TRUSSED CONCRETE STEEL CO., LTD.,
CAXTON HOUSE, WESTMINSTER, S.W.

To ascertain the Relative Resistance to the Transmission of Sound
of three "Telephone" Cabinets.

SIZE OF CABINETS—3 ft. $\times$ 3 ft. $\times$ 6 ft. 6 ins. high.

Cabinet A. (vv. 2789.)

Built with Cement and Breeze Partition Blocks. 3 ft. $\times$ 12 in.,
2 in. thick, joints made with cement mortar, 1-3.

Cabinet B. (vv. 2790.)

Built with Plaster Partition Blocks. 3 ft. $\times$ 12 in., 2 in. thick,
joints made with cement mortar, 1-3.

Cabinet C. (vv. 2791.)

Built with HY-RIB Sheet Reinforcement (28 gauge), coated each
side with cement and sand mortar (1-3), and rendered to a smooth
surface inside and out, to a finished thickness of 2 ins.

Under varied and repeated series of observations we find that the
C. Cabinet (HY-RIB) shows distinctly greater resistance to the trans-
mission of sound than either A. or B.

99, Southwark Street, London, S.E.,

22nd July, 1912.

DAVID KIRKALDY & SON.

FIRE TEST WITH HY-RIB.

(Reprint from the "Architects' Journal.")

An interesting fire test has recently been made with
HY-RIB, the metal lathing introduced by the Trussed
Concrete Steel Co., of Caxton House, Westminster, and the
results have given complete satisfaction. The test was
carried out on a piece of ground adjoining the works of the
Kodak Company at Wealdstone, Harrow. For the purpose
of the test a small structure had been erected. It consisted
of HY-RIB lathing, wired together, and covered with
plaster composed of three parts of sand to one of Portland
cement, finished to a total thickness of 2 inches, the final
coat being a mixture of two of sand to one of cement.
At the time of the test it had been standing for a
fortnight; and there can be no doubt that in its immature
condition the test to which it was subjected was very severe;
so severe, indeed, as barely to be justified, had it not been
considered advisable to test HY-RIB partitions under
the most adverse conditions. Despite the disadvantage of
a strong wind, the result of the test was highly success-
ful, affording indisputable evidence of the efficiency of
HY-RIB.

The interior of the hut was filled with timber, over which a quantity of paraffin was poured. This combustible mass being ignited the fire spread rapidly, its severity being intensified by a strong north wind which blew directly into the opening. So great was the heat that, only a few minutes from the start it was impossible to approach within a distance of 12 feet of the open front. The three plastered sides, however, were quite cool, and even when the fire had lasted for an hour the heat had not sufficiently penetrated to prevent the application of the bare hand.

The fire was constantly replenished with fresh supplies of wood in order to maintain the high level of the temperature. The test, which lasted for an hour, was easily withstood by the HY-RIB, although, as already mentioned, the lathing was simply wired together without any pretence to structural stability.

SPECIFICATION FOR HY-RIB WALLS.

Provide HY-RIB, Type....., Gauge....., for all walls.

Place all HY-RIB sheets with ribs inwards and mesh surface on exterior of wall. Interlock all adjoining sheets of HY-RIB at sides and ends. Sheets must be securely fastened together every 21 inches along the sides and at every rib at the end by wiring or by pinching of the lapped ribs with special pincers (see illustration page 64). Where joints occur between supports, each adjacent joint must be staggered at least 2 feet. Allow a lap of 3 inches where joints occur over supports, otherwise 12 inches.

HY-RIB must be rigidly attached to steel framing by means of clips or strong galvanized wire, and to wood framing by staples or nails. Such attachments shall be made in the interlocking side laps between sheets at least every 10½ inches. Where supports are over 6 feet apart, HY-RIB sheets shall be temporarily braced before plastering. Where HY-RIB is attached to wood supports place lath side away from the wood.

MATERIALS.

The materials composing the plaster for walls shall consist of:—

(a) Best English slow-setting Portland Cement equal in all respects to the requirements of the British Standard Specification.

(b) Sand which is free from organic matter and uniformly graded in size from coarse to fine.

(c) Waterproofing Paste, approved by the Trussed Concrete Steel Co.

(b) Best long cowhair free from grease and well separated.

APPLICATION.

The plaster for the exterior coat and for the first of the interior coats should be made up as follows:—

Portland Cement	..	..	..	1 part
Sand	..	..	..	4 parts

The sand and cement to be mixed together dry and passed through a sieve till the mass is of a uniform colour. The hair and water to be added and the whole mixed and applied as rapidly as possible.

Hair will be required only in the interior first coat and should be added to the plaster in the proportion of 3 lbs. of hair to every cubic foot of plaster.

This composition shall be made up only in lots that can be immediately applied, and any material that has been mixed with water longer than 30 minutes before applying shall be rejected.

PLASTERING OF WALLS.

Apply a first coat of this plaster to the interior of the walls, beginning at the foot and working upward. While this coat is still wet, scratch over the surface to form key for the finish coat, which shall be applied after the first coat has set sufficiently hard to hold it.

The plaster for the interior finish coat shall be of the same proportions as first scratch coat except that the hair must be omitted. The interior finish coat must be trowelled to a perfectly smooth finish.

The exterior finish shall then consist of composition above specified, and if waterproofing is required, waterproofing paste or powder should be added to the mixing water in proper proportions. The thickness of this water-proofed plaster shall be at least half an inch. The finish coat must be floated free from any porous imperfections. Total thickness of wall to be $1\frac{3}{4}$ inches and upwards.

Plastering of HY-RIB walls should be carried out in panels not exceeding 12 feet width giving a clean joint vertically from gutter to ground. Joints, on completion of the wall, should be caulked in.

In plastering HY-RIB walls, if these are simply finished off with a trowel to a fair face, more satisfactory results will be obtained than when a straight edge is used to screed them up.

PROTECTION.

Thoroughly protect the finished work from vibration or other disturbance and from too rapid drying from the direct rays of the sun by means of damp canvas or sprinkling. The finished work must be kept thoroughly moist in this way for at least two days after plastering. Care should be taken to protect the plaster from frost.

EXPANSION RODS.

In walls where it is found necessary to run the main ribs of the HY-RIB *vertically*, place $\frac{3}{16}$ or $\frac{1}{4}$ -inch rods, spaced 24 inches apart, at right angles to the ribs.

Wherever possible it is advisable that the structure should be so designed that the main ribs of the HY-RIB will extend *horizontally*.

SPECIFICATION FOR HY-RIB FLOORS AND ROOFS.

REINFORCING STEEL.

Provide HY-RIB, Type....., Gauge....., for all floors and roofs.

Place all HY-RIB sheets with the mesh surface downwards. Interlock all adjoining sheets of HY-RIB at sides and ends. Sheets must be securely fastened together every 21 inches along the sides and at every rib at the ends by

wiring or by punching of the lapped rib with special pincers. Where joints occur between supports, each adjacent joint must be staggered at least two feet. Allow a lap of 3 inches where joints occur over supports, otherwise 12 inches.

HY-RIB must be rigidly attached to steel framing by means of clips or strong galvanized wire, and to wood framing by staples or nails. These attachments should be made on the interlocking side joints every 10½ inches apart.

HY-RIB sheets must be supported as required by Table B, page 36, and, if the spans are exceeded, necessary temporary supports must be provided at corresponding centres until the concrete is set.

No loads must be placed on HY-RIB before concreting and not until the concrete has thoroughly set. Planks for runways shall be so arranged as to come over supports.

HY-RIB must be plastered as specified on the underside after the concrete has set.

MATERIALS.

The materials composing the concrete and plaster shall consist of :—

(a) Best slow-setting English Portland Cement, which is equal in all respects to the requirements of the British Standard Specification.

(b) Sand which is free from organic matter and uniformly graded in size from coarse to fine.

(c) Broken stone or gravel which is good, hard dense material—clean and of such size as to pass through a half-inch ring.

APPLICATION.

Cover the HY-RIB sheets with a concrete made up as follows :—

Portland Cement	..	..	..	1 part.
Sand	..	..	..	2 parts.
Broken Stone	..	..	..	4 parts.

When the concrete has set sufficiently, plaster the under side to a thickness to ½-inch with the following mixture :

Portland Cement	..	..	..	1 part.
Sand	..	..	..	4 parts.

This composition shall be made up only in lots that can be immediately applied, and any material that has been mixed with water longer than 30 minutes before applying shall be rejected.

PROTECTION.

In hot weather concrete should be well sprinkled, and rapid drying prevented. The concrete slab must be kept thoroughly moist in this way for at least 3 days after placing. In frosty weather concrete work should be stopped unless it is well protected.

No concreting shall be done when the temperature is below 34 degrees Fahr. on a falling thermometer, or below 32 degrees on a rising thermometer, and during the winter months a thermometer shall be kept on the work. During frosty weather the exposed surfaces of green concrete must be protected until the concrete has thoroughly set.

EXPANSION RODS.

Where the width of the building is over 200 feet in a direction at right angles to the main ribs of the HY-RIB place $\frac{3}{16}$ or $\frac{1}{4}$ -inch round rods, spaced 24 inches apart, on the top of the ribs and at right angles to them.

ARCHED FLOORS.

Where curved sheets of HY-RIB are used for reinforcement of concrete arches it is not necessary to interlock the sheets along the sides, but side ribs should be thoroughly wired together, otherwise splice and place HY-RIB as provided above.

SPECIFICATIONS FOR SUSPENDED CEILINGS.

Suspended ceilings shall be built of HY-RIB attached to lines of supports, as indicated in detail; supports to be $1\frac{1}{2}$ -in. by $\frac{1}{4}$ -in. flats or $1\frac{1}{4}$ -in. channels, with following spacing and HY-RIB.

Spacing of Supports.	Reinforcement.
2 ft. 11 in.	No. 28 G. Hy-Rib
3 ft. 11 in.	26 G. "
4 ft. 11 in.	24 G. "

Each rib of HY-RIB shall be attached at each support.

Interlock all adjoining sheets of HY-RIB at sides at ends. Sheets must be securely fastened together every 21 inches along the sides and at every rib at the ends by wiring or by clinching of the lapped ribs with special pincers. Where end joints occur between supports, each adjacent joint must be staggered at least 2 feet. Allow a lap of 3 inches where joints occur over supports, otherwise 12 inches.

SPECIFICATIONS FOR SOLID HY-RIB PARTITIONS.

Provide HY-RIB, Type....., Gauge....., for all solid partitions.

Interlock all adjoining sheets of HY-RIB at sides and ends. Sheets must be securely fastened together every 21 inches along the sides and at every rib at the end by wiring or by punching of the lapped ribs with special pincers (see illustration page 64). Where end joints occur between supports, each adjacent joint must be staggered at least 2 feet. Allow a lap of 3 inches where joints occur over supports, otherwise 12 inches.

HY-RIB must be attached to floors and ceilings by means of small angles or channels, wooden strips, or by letting into grooves according to construction of floor and ceiling as indicated in details. Where horizontal supports are over 5 feet apart, HY-RIB sheets should be temporarily strutted every 5 feet before plastering. (See page 52.)

Above 20 feet, structural supports should be erected vertically in accordance with Side Wall Table, page 6, and the HY-RIB run horizontally. It may be necessary also in special cases for partitions above 12 feet, which will be subjected to constant vibration, as in factories, to be constructed in the same manner.

Minimum requirements HY-RIB running vertically.

Height of Ceilings.	Thickness of Partitions.	Reinforcement.
10 ft.	1½ in.	No. 28 G. HyRib
12 ft.	2 in.	28 G. "
14 ft.	2½ in.	26 G. "
16 ft.	2½ in.	26 G. "
18 ft.	2¾ in.	24 G. "
20 ft.	3 in.	24 G. "



Hy-Rib and Concrete Water Tank.
When Architecturally treated Concrete on Hy-Rib is very effective.

ORDERING HY-RIB.

HY-RIB is supplied in sheets $10\frac{1}{2}$ inches wide, measured from centre to centre of the outside ribs. One lineal foot of each sheet covers $\frac{7}{8}$ of a square foot of roof, floor or wall surface. No allowance need be made in ordering for side laps, as these are provided in the HY-RIB. Allow 3 inches for end laps where splice is made over supports; otherwise 12 inches.

Ribs of HY-RIB are 13-16 inches high and $3\frac{1}{2}$ inches centre to centre.

Standard lengths of sheets are 6 feet, 8 feet, 10 feet, and 12 feet; cuts will be charged at the rate of $\frac{1}{4}$ d. per cut, and where waste results, it will be charged to the purchaser.

In ordering always state length of sheet required.

HY-RIB is furnished in three gauges—Nos. 28, 26 and 24.

We recommend the use of painted HY-RIB, but can supply it unpainted if desired.

HY-RIB is packed in bundles of 16 sheets, standard lengths. Cross-sectional area of each bundle is one-half square foot.

In ordering curved HY-RIB, please give dimensions of chord and rise.

All crates will be charged at cost.

For estimating cost of carriage, reckon 28 gauge = $6\frac{3}{4}$ lbs., 26 gauge = 8 lbs., and 24 gauge = 10 lbs. per square yard respectively.

ORDER FORM.

Sheets required		Square Yards.	Gauge.	If Curved details and sketches.
No.	Length.			

When ordering Plate and Rib Clips the thickness of flange should be mentioned in the case of Plate Clips, and length of clip or size of steel section in the case of Rib Clips.

SOME USERS OF HY-RIB.

The Admiralty.
H.M. Air Ministry.
H.M. War Office.
H.M. Board of Agriculture.
H.M. Office of Works.
H.M. Prison Commissioners.

Great Western Railway
London, Brighton & South Coast
Railway.
London & North Western Railway
London & South Western Railway
London Underground Railways.
Midland Railway.
North Eastern Railway

Aldershot Gas & Water Company.
Birmingham Gas Department.
Bournemouth Gas & Water Co.
Brentford Gas Co.
British Gas Light Co.
Commercial Gas Co.
Eastbourne Gas Co.
Gas Light & Coke Co.
Ilford Gas Co.
Liverpool Gas Co.
Maidstone Gas Co.
Scarborough Gas Co.
Sheffield Gas Co.
South Metropolitan Gas Co.
Tottenham District Light, Heat &
Power Co.
Wandsworth & Wimbledon Gas Co.

Bedwas Navigation Colliery.
Carlton Main Collieries
Consett Iron Co.
Dalton Main Collieries.
Ebbw Vale Steel Iron & Coal Co.,
Ltd.
Grange Iron Co.
Harton Coal Co., Ltd.
Rhymney Iron Co., Ltd.
Rothervale Colliery.
Sharlston Collieries.
Whitehaven Colliery Co.

Sir W. G. Armstrong, Whitworth &
Co.
Sir Wm. Arrol & Sons.
Arrol-Johnston Ltd.

Associated Portland Cement Manu-
facturers.

Balfour, Beatty & Co., Ltd.
Wm. Beardmore & Co., Ltd.
Bolckow Vaughan Ltd.
J. Booth & Co.
British Aluminium Co., Ltd.
British Carbide Factories.
Brunner Mond & Co., Ltd.
Simon-Carves Ltd.
Cleveland Bridge & Engineering
Co., Ltd.
Coke Oven Construction Co., Ltd.
The Coppee Co. (G. B.) Ltd.
Crosthwaite Furnace Co.
Dorman Long & Co., Ltd.
Erith Oil Works, Ltd.
General Electric Co., Ltd.
Gramophone Co., Ltd.
Harland & Wolff.
Henry Hope & Sons, Ltd.
King's Norton Metal Co., Ltd.
Kodak Ltd.
Lever Brothers, Ltd.
Macintosh & Co., Ltd.
Maconochie Brothers Ltd.
A. & J. Main & Co., Ltd.
Millom & Askam Hematite Iron
Co., Ltd.
Nobel's Explosives Co., Ltd.
Palmer's Shipbuilding & Iron Co.
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